

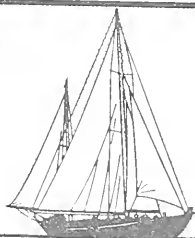
HAWAIIAN FISHES



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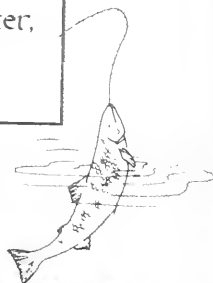
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Editor, Fisherman,
Educator, Mentor

Woods Hole
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Institution



To Mr Daniel Merriam

from

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Mather Jr

Mather Coffinberger

April 1957



HAWAIIAN FISHES

A Handbook of the Fishes Found Among the Islands
of the Central Pacific Ocean

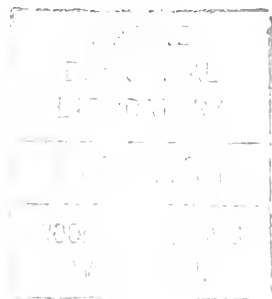
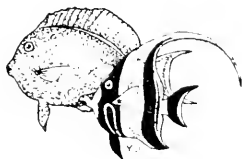
by

Spencer Wilkie Tinker

Director of the Waikiki Aquarium,
University of Hawaii

Illustrated by

Gordon S. C. Chun and Y. Oda



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HONOLULU, HAWAII

1944

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1944

Preface

This volume is intended to serve as a handbook on Hawaiian fishes. It is written to help the students, the sportsmen, and the general public in identifying the fishes with which they come in contact.

The book is a simple compilation of the many scientific publications dealing with Hawaiian fishes. It presents a popular and non-technical treatise of both fresh and salt water species without reference to scientific terminology.

A bibliography has not been included as a part of this book because several complete lists of references may be found in other works. Individuals interested in bibliographies and detailed scientific information on Hawaiian fishes should consult the following references:

Jordan, David Starr and Barton Warren Evermann—Aquatic Resources of the Hawaiian Islands. United States Fish Commission Bulletin Volume 23, 1903.

Fowler, Henry W.—Fishes of Oceania. Memoirs of the Bernice P. Bishop Museum, Volume 10, 1928.

Fowler, Henry W.—Fishes of Oceania—Supplement 1. Memoirs of the Bernice P. Bishop Museum, Volume 11:5, 1931.

Fowler, Henry W.—Fishes of Oceania—Supplement 2. Memoirs of the Bernice P. Bishop Museum, Volume 11:6, 1934.

The arrangement of the families and the scientific terminology used in this book are based on the works of Henry W. Fowler. In addition, we are indebted to David Starr Jordan, Barton Warren Evermann, Charles Henry Gilbert, and Alvin Seale for the mass of data which they have collected and for the scientific foundation which they established in the field of Hawaiian ichthyology. We acknowledge with humble appreciation the contribution of these men, all scholars and specialists in the field of ichthyology.

In addition we wish to thank the following individuals who have assisted in the preparation of this book: Mrs. Alice K. Alexander, Miss Janet Bell, Masao Miyamoto, Naosuke Nakamoto, Mrs. Gwen Tinker, and Miss Margaret Titcomb.

June 15, 1944
Honolulu, T. H.

SPENCER W. TINKER
GORDON S. C. CHUN

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HAWAIIAN FISHES

I. Introduction

Fishes are one of the most interesting and fascinating groups of animals on earth. Whether they are observed swimming happily about in nature, fighting for their life at the end of a hook, or delicately served upon your dinner plate, they have few equals among the animals in captivating and holding the attention of young and old.

Fishes live in a vivid and colorful world all of their own. We know comparatively little about the homes of the fishes for very few of us ever venture beneath the water's surface to study our cold-blooded cousins in their natural habitat. We prefer, instead, to see our fishes through glass, from boats and piers, in nets, or frying pans and are content to learn nothing more about them.

Fishes Are Well Adapted for Life in the Water

Most fishes must depend on their ability to swim for both their life and their livelihood. They are consequently as nearly perfectly streamlined as any animals on earth. Since the water in which they live offers much more resistance to movement than does air, it requires much more effort for them to move about than we realize. To accomplish this, fishes are equipped with powerful muscles. The strongest of these muscles operates the tail and its caudal fin which are used for both propulsion and for steering.

In addition to the tail, one or two dorsal fins in the midline of the back and an anal fin in the midline of the lower side help to steer and to propel the fish. A pair of pectoral fins, corresponding to our arms, are located on the sides of the body just behind the head. A pair of ventral fins are located on the lower surface of the body at varying points ranging from just behind the head to just in front of the tail. These paired fins are used in leisurely swimming and help to keep the body erect.

The head of the fish is covered with bony plates or scales and contains a pair of eyes, a set of nostrils, and a mouth. Fishes lack the sense of hearing as we know it, but they are thought to hear by means of minute

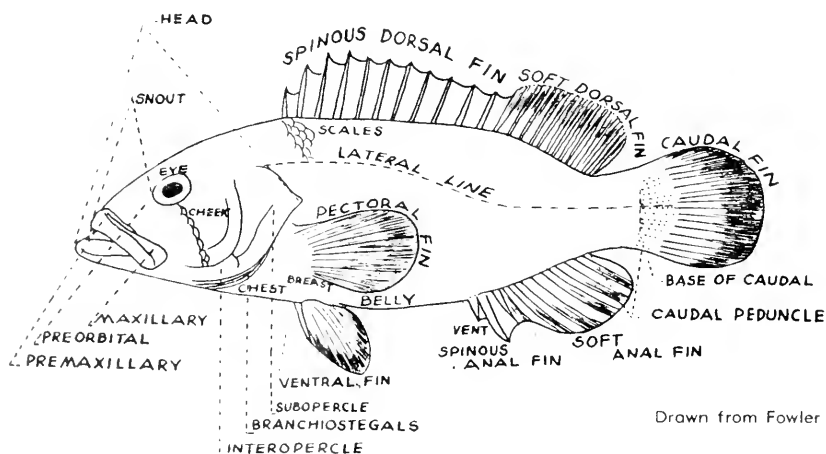
tubes just beneath the surface of the body. The most conspicuous of these tubes runs from the head along the side of the body toward the tail and is called the lateral line.

The bodies of all fishes are covered by a skin in which scales of varying kinds and numbers are implanted. These serve as a protection for the fish in time of trouble and keep parasites and enemies at bay.

The skeletons of fishes are much weaker than those of land animals because they do not need to support their own weight. They, nevertheless, have many of the bones of the higher vertebrates, but these bones are much weaker. In the case of the sharks and rays, the bones remain as cartilages throughout life and never become as hard and firm as they do in other fishes.

Fishes require energy to drive their bodies through the water in which they live the same as other animals do. This energy is obtained as in man from the oxidation or burning of food. They differ from man, however, in the manner in which they obtain their oxygen. Man takes his oxygen from the air about him, while fishes obtain it by means of gills from the air dissolved in the water about them.

It is obvious that the bodies of fishes are designed to fit the conditions about them. Their shape and structure have been designed to better adapt themselves to the peculiar place in which they live. Very few other animals are as well adjusted to their environment.



Drawn from Fowler

Fishes Are Ancestors of Higher Vertebrates

Fishes are a very ancient group of animals and date back in time at least 200,000,000 years or more. Even in early Silurian and Devonian times many of the present day groups of fishes were well established, while other more primitive forms still held on to the evolutionary thread of life. Many of these ancient fishes have perished and lie buried in the rocks and ocean bottoms, while others have come down to us almost unchanged by the passage of time.

Although we do not like to think of these early fishes as our ancestors, most of the higher vertebrates appear to have slowly ascended from these ancient creatures in the course of many millions of years.

All of the vertebrates, including the amphibians, reptiles, birds, and mammals, show definite proof in their bodily structure and in their embryology of having had fish-like ancestors. Although we cannot point with absolute certainty to the group of fishes from which the higher vertebrates have sprung or to trace completely the changes leading upward from the fishes, we feel that the information which we have gathered thus far points unmistakably to the fact that the higher vertebrates have ascended from the fishes.

Fishes Vary Widely

Over a long period of time fishes have been slowly changing. Many have changed to adjust themselves to the changing conditions about them, while others have changed accidentally. In general, they have increased in the number of kinds until today we have over 40,000 different species, each related to the other, yet each a little different from its relatives in its appearance and in its habits.

These fishes present an unusual panorama in size, color, habits, and distribution. They range in size from microscopic fishes to sharks which are over fifty feet in length and from fishes which are totally black in color through all of the colors of the rainbow to transparent forms. They vary as widely in their habits as in their size. They range from parasitic fishes to free living forms, from carnivorous to herbivorous forms, from sedentary to active types, from forms which lay eggs to forms which bring forth their young alive, from blind forms to fishes possessing remarkable vision, and from fishes which live on land to others which live in the abyssal depths of the sea. But few other creatures on earth occupy a more interesting environment, are more cleverly designed, go so far back in

geologic time, have so many evolutionary descendants, and offer so numerous, so wide, and so varied an assortment of creatures as do the fishes.

Hawaii Has Three Groups of Salt Water Fishes

The fishes which live about the Hawaiian Islands include nearly seven hundred species which are divided most unequally between the salt and the fresh water. Where we have a myriad of fishes of both species and numbers in salt water, we have but few fresh water species. Our fresh water fishes number about two dozen, about half of which have been introduced from other areas. The native fresh water fishes have been derived from related marine forms and are not of much importance.

Hawaii's marine fishes, numbering more than 650 species, fall into three general groups depending on the place in which they live—the shore and reef fishes, the off-shore fishes, and the abyssal fishes.

We know almost nothing about the abyssal fishes. They are all small, bizarre animals, somewhat beyond our reach, and provide us with no food or commercial products.

The off-shore, deep-sea, or ocean-going fishes are an important group for us because they provide us with much of our food fish. Because many of these fishes live in schools, or are of large size, their capture is profitable and their flesh appears in our markets in large quantities.

The reef and shore fishes are the most unusual and interesting of the three groups because they include the fishes of bizarre shapes and brilliant colors for which the tropics are famous. These shore fishes provide the markets with some food fish, but their interest lies in their beauty and their brilliance.

Hawaii's Reef Fishes Are of East Indian Origin

In general, the shore or reef fishes found about the Hawaiian Islands are representatives or members of tropical families of fishes which are either distributed around the world or are limited to the waters of the south Pacific Ocean, the East Indies, and the Indian Ocean. Most of the fishes of the Hawaiian Islands may be considered as members of the East Indian fauna, for this region is rich in the kinds of fishes which we find in the Hawaiian Islands. The islands of the East Indies may be considered as a kind of a center from which Hawaiian and Polynesian reef fishes have come in ancient times. Many of the fishes found about Hawaii today also occur in the East Indies. We have many fishes in Hawaiian waters which are found nowhere else in the world, but which are related

to East Indian forms. The Hawaiian Islands have very few fishes in common with Japan and fewer still in common with the western coasts of the Americas.

Scientists believe that in ancient times a large number of tropical fishes were developed in the East Indies and that from this area they spread out westward through the Bay of Bengal and the Indian Ocean to the eastern coast of Africa, and eastward through the many islands of the Pacific Ocean. So we might say that the Hawaiian Islands lie on the outskirts of the East Indian faunal region and that Hawaii's reef and shore fishes are members or relatives of brilliant tropical groups which have come from the East Indian area in time past.

II. The Families of Hawaiian Fishes

THE CAT SHARK OR ROSETTE SHARK FAMILY

1 *Family Scylliorhinidae*

The cat sharks are all small in size and spotted in color and may be recognized by the fact that they have a broad mouth which is filled with small, closely set teeth and also by the fact that their fins are without spines. In addition, they always have the first dorsal fin placed directly above the ventral fins, and their tails are not keeled or bent upward as in many other sharks.

They are the most primitive of present day sharks and are usually found in rather deep water. They lay their eggs in a rectangular egg case which has long prehensile tubes at its four corners. In this egg case the young sharks grow until they are able to swim; then they break through its walls and swim away.

The members of this family are found most commonly in warm, tropical waters.

The cat sharks have but one known representative in Hawaiian waters and of this representative only one specimen was ever taken.

Hawaiian Cat Shark

1-1 *Apristurus spongiceps* (Gilbert)

The Hawaiian cat shark is known from a single specimen which was caught near Nihoa in the Leeward Islands of the Hawaiian Archipelago. The shark, a mature female, was caught in a dredge between 313 and 800 fathoms. It was of a uniformly brown color and measured about twenty inches in length.

THE WHALE SHARK FAMILY

2 *Family Rhineodontidae*

This family contains a single species known as the Whale Shark. It is a rare fish of immense size and is probably a wanderer into Hawaiian waters.

Whale Shark

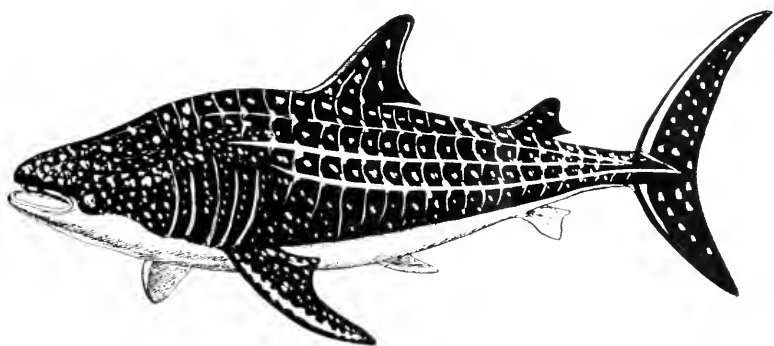
Also known as the Basking Shark or Bone Shark

2-1 *Rhineodon typus* Andrew Smith

Plate I, Figure 2

The whale shark is the largest fish in the world. Although larger fishes may have existed in ancient times, the whale shark has no equal

among modern day fishes. This fish will reach a length of forty or fifty feet and will weigh many tons. The bodies of these fishes are brownish in color above, white below, and are marked with many thin, white, vertical lines and scattered spots. In addition, the upper part of the body is marked with ridges which run lengthwise of the body. The caudal fin is long, little raised, and contains a keel along its side. The snout is broad, the spiracle small, and the mouth contains a large number of minute teeth. The mouth also contains a large number of curious gill rakers set along its gill arches. These gill rakers are from four to six inches in length and serve much the same function as the whalebone of whales.



Whale sharks are found throughout the warm tropical waters of the Atlantic, Pacific, and Indian Oceans. They are most commonly found near Florida, Lower California, and off the east coast of Japan and are probably wanderers into Hawaiian waters.

Very little is known of the habits of these great fishes. They are reported to live in schools and to feed on the small crustaceans and other plankton which they strain from the sea water with their modified gill rakers. They are sluggish in their habits and are thought to be viviparous.

Although this fish once supported a small fishing industry off the coast of Massachusetts and in the North Sea, it is of little commercial importance today. This shark contains a gigantic liver and the oil which is extracted from it is of some value to man. There is one report of a liver which yielded 400 gallons of oil. Because of its scarcity this great fish is of little economic importance today.

THE MAN EATING SHARK FAMILY

Also known as the Great White Shark or Mackerel Shark Family

3 Family *Isuridae*

The man eating sharks are all of large size with stout, heavy, robust bodies and slender tails. The gill slits are wide and are all placed in front of the pectoral fins which are large and falcate in shape. The head of these sharks is conical in shape and contains a large mouth equipped with teeth and muscles which scientists say are the most complex of all sharks.

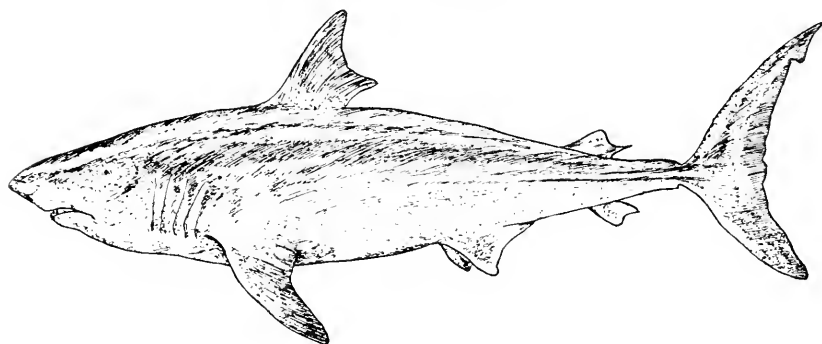
There are many fossil species in this family, but only about six species are alive today.

Two members of this family are known from Hawaiian waters.

Niuhi or Great White Shark

Also known as the Man Eating Shark, Mano, or White Pointer

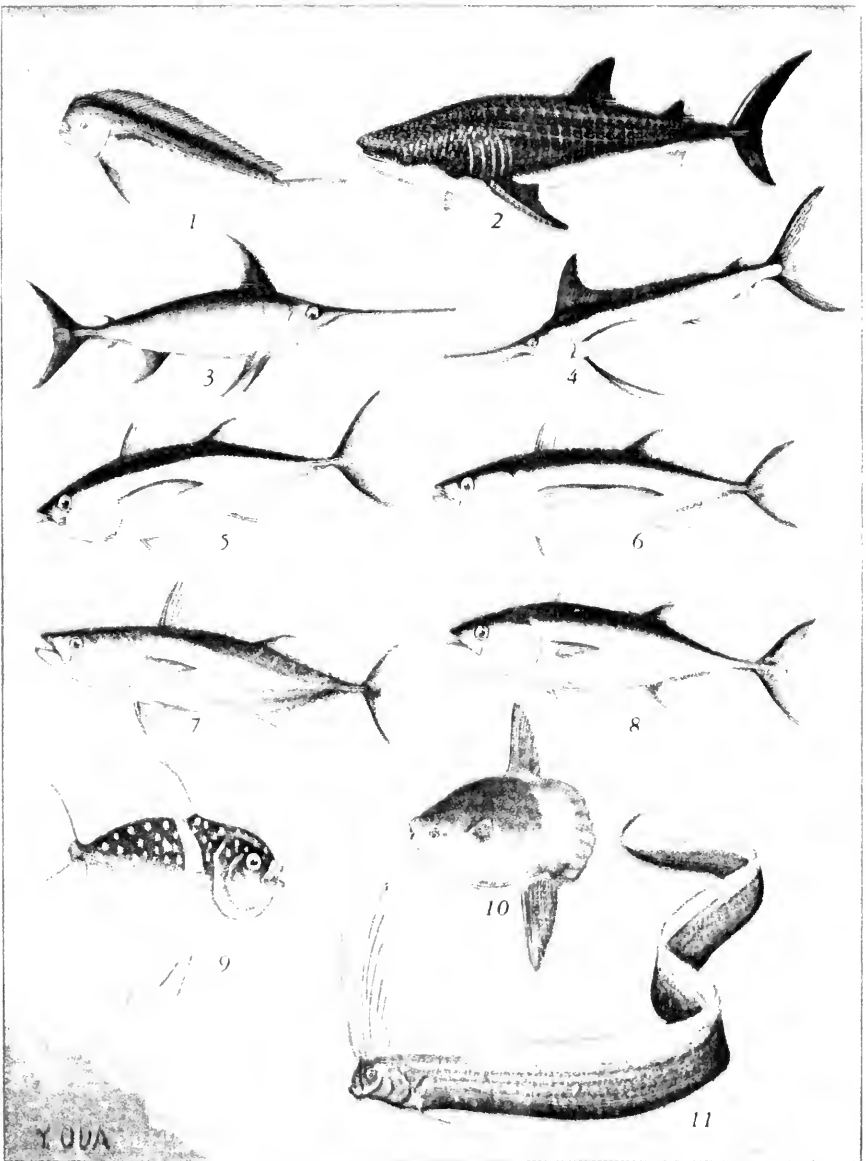
3-1 *Carcharodon carcharias* (Linne)



The niuhi is one of the very largest and fiercest of sharks. It is said to reach a length of thirty feet and some authorities claim that it will grow to be forty feet in length. Jordan and Evermann report that one of these sharks, which was caught off the coast of Soquel, California, measured thirty feet in length and contained in its stomach a young sea lion weighing one hundred pounds.

These sharks must have reached an enormous size in ancient times. The Challenger Expedition dredged up teeth of this shark which measured five inches in length. Since the jaws of a thirty-six foot specimen in the British Museum have three inch teeth, the five inch teeth must have belonged to a fish nearly one hundred feet in length.

Plate I



1. *Common Dolphin*
2. *Whale Shark*
3. *Common Swordfish*
4. *Pacific Striped Marlin*
5. *Yellow Fin Tuna*
6. *Long-Finned Albacore*

7. *Ocean Bonito*
8. *Blue Fin Tuna*
9. *Opah*
10. *Ocean Sunfish*
11. *Oarfish*

This shark may be recognized by its teeth alone. The scientific name *Carcharodon* comes from two Greek words which mean rough teeth. It is the only fish in which the teeth are large, triangular, and serrate along their edges. The body of this shark is a leaden gray color above, white below, and has a keel on each side of the tail at its base.

Little is known of the habits of this shark, suffice it to say that it lives at the surface in warm seas, and is probably the strongest and most voracious of all sharks.

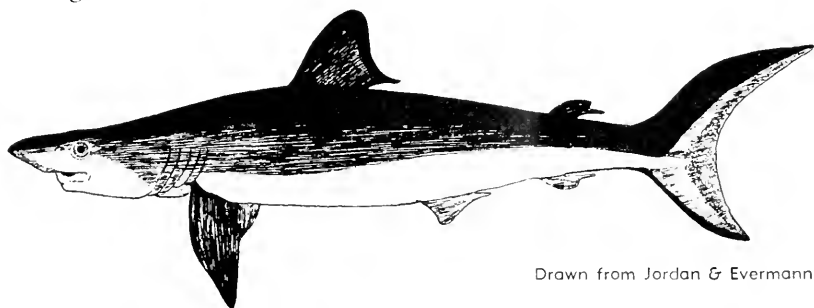
This shark is of no commercial importance today. Its teeth were used in Hawaii in olden times for making many types of implements many of which are on exhibit in the Bishop Museum in Honolulu. It is reported to have been kapu to women in olden times. Of all of the sharks it has the worst reputation, as a man eater.

The niuhi is known to inhabit all of the tropical and temperate seas of the globe. It is occasionally taken in both the Atlantic and Pacific Oceans and along the shores of the Hawaiian Islands. It is cosmopolitan in the temperate and tropical seas of the world.

Mackerel Shark or Bonito Shark

3-2 *Isurus glaucus* (Muller & Henle)

The mackerel shark is reported to reach a length of twenty-four feet, although most specimens seem to be much smaller in size. It is dark blue in color above and is whitish beneath. The snout is long and pointed and contains a mouth in which the teeth are long and sharp and have knife-like edges.



Drawn from Jordan & Evermann

It is reported that this fish contains the flesh most esteemed by the Japanese.

This shark is found in the temperate and tropical waters of the Pacific Ocean. It has been recorded from Japan, Java, Hawaii, and California.

THE THRESHER SHARK OR FOX SHARK FAMILY

4 Family *Alopiidae* (*Vulpeculidae*)

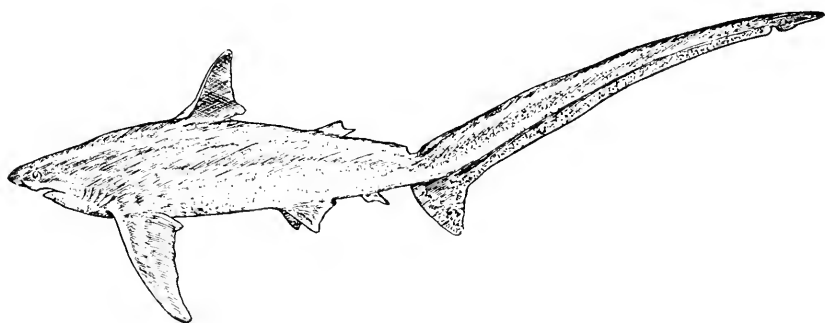
This family contains a single species which is known as the thresher shark. It is widely distributed and is often found in Hawaiian waters.

Thresher Shark

Also known as the Whip-Tailed Shark, Thrasher Shark,
Swivel-Tail Shark, or Singletail Shark

4-1 *Alopias vulpinus* (Bonnaterre)

Of all of the sharks in the ocean the thresher shark can never be mistaken because it possesses a tail as long as its body. The body of this shark is slate blue in color above, usually a dirty white color below, and is marked with faint, bluish spots. The surface of the body is roughened and the snout is short and blunt. It is a large shark and will reach a length of twelve, fifteen, or even twenty feet and will weigh nearly one thousand pounds.



The thresher shark is a speedy surface swimmer and spends its time cruising about feeding on small fishes including herring, shad, pilchards, mackerels, and other fishes. It is reported that the thresher swims around the outside of a school of fishes using its tail to pound the water and to round up and to stun or kill the smaller fishes. The thresher is reported to feed on the outer edge of the school as it swims about. It continues to feed in this manner until the school scatters or is consumed or until the appetite of the shark is satisfied.

This fish, in spite of the above story, is not especially ferocious and does not harm man.

Thresher sharks have no economic importance and are not sought after commercially.

The thresher shark is widely distributed and is found in all of the temperate and tropical seas of the world. It is more abundant in warm seas. It is reported to be fairly common in the waters about Japan and is occasionally seen in Honolulu markets.

THE GRAY SHARK FAMILY

Also known as the Requin or Blue Shark Family

5 *Family Galeorhinidae (Eulamiidae)*

The family of the gray sharks is the largest family of existing sharks and is represented in Hawaiian waters by about ten species. They are nearly all uniform in color and do not have spines on their two dorsal fins. They also lack the groove which runs between the eye and the nostrils in some sharks. The bodies of these fishes are long and their tails are flattened. The snout is somewhat pointed and the mouth contains a large number of teeth which are arranged like a brick pavement.

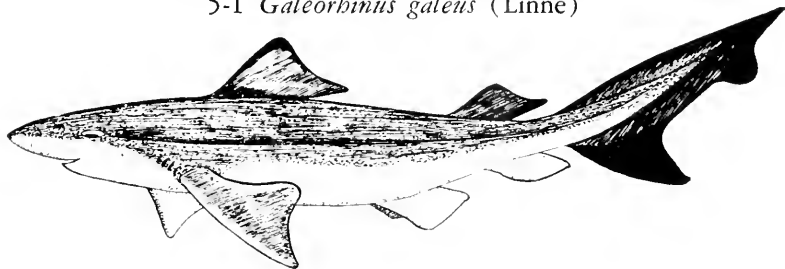
The gray sharks are nearly all dwellers of the open sea where they spend a roving, predatory life at the surface of the water. Some of the members of the family are small and harmless while others are large and voracious.

These sharks are of some economic importance. Their skin is a valuable article of commerce called shagreen and is used for binding books, sword handles, scabbards, etc. The flesh of these fishes is white and firm, very tough, and has an unpleasant smell to westerners. It is eaten in both the Philippine Islands and the Orient and is canned for food and made into fertilizer.

Blue Shark

Also known as Tope, Toper, Whitehound, or Pennydog Shark

5-1 *Galeorhinus galeus* (Linne)



The blue shark, which is of medium size, is a brown or dusky gray above and lighter in color below. The teeth, which are alike in both jaws, are set obliquely, are notched, and have fine saw edges.

These sharks are fierce and voracious and are enemies of fishermen. They are bottom feeders living on fish, crustaceans, shell fish, dead fish, and other foods. The young are born alive during the summer months. It is reported that one female shark may give birth to young ranging in number from twenty to fifty.

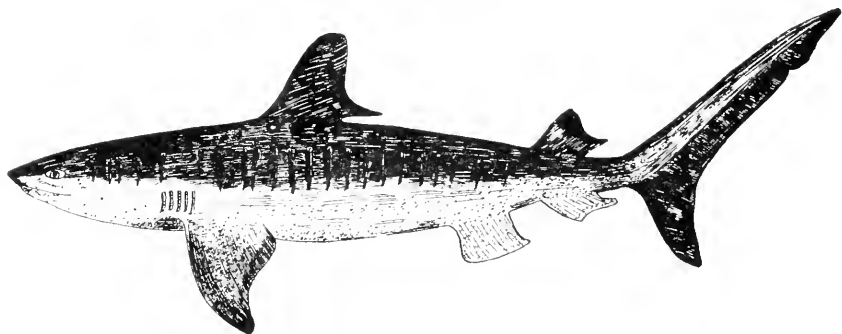
Although the liver, skin, and fins of this fish are valuable, the flesh is so rank and offensive that this shark is often referred to as Sweet William.

The blue shark is cosmopolitan and lives in all warm seas. Dr. Steindachner, the famous German ichthyologist, caught a five foot specimen at Laysan Island at the time of his visit here in 1901.

Tiger Shark

Also known as Mano, Manoo, or Spotted Shark

5-2 *Galeocerdo arcticus* (Faber)



The tiger shark is a large shark and measures from fifteen to thirty feet in length. It is brownish in color above with blackish cross bars and is whitish or paler below. The body is robust and tapering and the head is blunt with a short, broad snout and a crescent shaped mouth. This fish may be identified by the pit on the tail above and below the base of the caudal fin and by the pore or spiracle behind the eye. The teeth are large, obliquely set, coarsely serrated on both margins, and have a deep notch on the outer margin. The caudal fin is about one-third the length of the body.

Young sharks are brownish in color with numerous irregular darker spots along the sides and on the fins. These spots are often joined to form bars. As the fish grows older, the color darkens and the markings fade so that the adults become a uniform grayish brown.

The tiger shark is regarded as one of the fiercest of sharks in spite of the fact that it is rather sluggish. It has been described as large and voracious and reported to be a man eater. It has been known to eat porpoises, dolphins, turtles, sea birds, other sharks, all fishes, squids, crabs, shellfish, and carrion.

This shark is viviparous in its reproductive habits and gives birth to its young alive. It is reported that this fish has been known to have as many as fifty-seven young in one female.

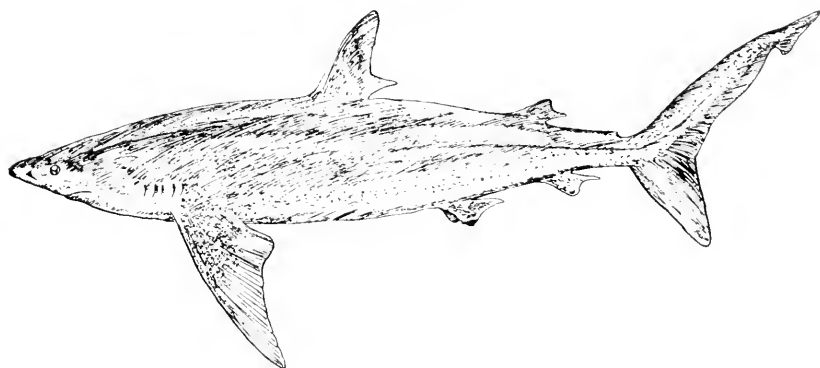
This fish was "kapu" to women in olden times in the Hawaiian Islands and as such was reserved to grace the tables of the men.

The tiger shark is known from all of the tropical and temperate seas of the world. It is widely distributed in the tropics and may be regarded as inhabiting all of the warm seas of the globe.

Great Blue Shark

Also known as the Blue Shark or Mano Ihuwaa

5-3 *Glyphis glaucus* (Linne)



The great blue shark has a long, slender body and will reach a length of twenty or twenty-five feet. It is light bluish gray in color above and is paler beneath. It has the usual spiracle behind the eye. The teeth in the upper jaw are obliquely placed and are scarcely constricted at their base; those in the lower jaw are more slender in shape. The teeth in both jaws are serrated along their edges.

This shark is a swift swimmer and voracious in its habits. It is said to be a man eater and is reported to be more aggressive at night. The young sharks seem to be born late in the spring of the year or in the early summer. They number thirty or more and as many as forty-seven

have been recorded from one mother, each of which measured fifteen inches in length.

The Hawaiian name of *Mano Ihuwaa* means "nose and canoe" and comes from the fact that this sea beast is reported to like to rest its head upon the outrigger of the canoe.

The great blue shark is cosmopolitan in distribution and is found in all of the warm waters of both the tropical and temperate seas of the world. It is most abundant in tropical seas and is commonly found along the Pacific coast of the United States.

Black Tip Shark

5-4 *Eulamia limbatus* (Muller & Henle)

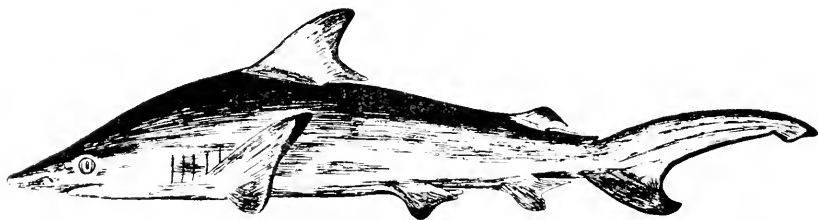
This shark is grayish in color above, pale yellow below, and reaches a length of about six feet. The body and the head are compressed and the snout is elongated. The fins of this shark all have dark tips upon them and so give the shark its common name.

The black tip shark and the sand shark are somewhat confusing. Fowler suggests that they may be distinguished by the position of their fins. In both species the second dorsal fin is smaller than the anal fin. In the black tip shark the origins of the second dorsal and anal fins are opposite, while in the sand shark the anal fin arises posterior to the origin of the second dorsal fin. The black tip shark has an elongated snout while the sand shark has a snout which is moderately blunt.

This little shark is found in tropical and temperate seas of all oceans. It feeds on fishes and carrion.

Sand Shark

5-5 *Eulamia sorrah* (Mulle & Henle)



Drawn from Jordan & Evermann

The sand shark is a small shark, three or more feet in length. It is pale brown above and whitish beneath with a paler brown streak along

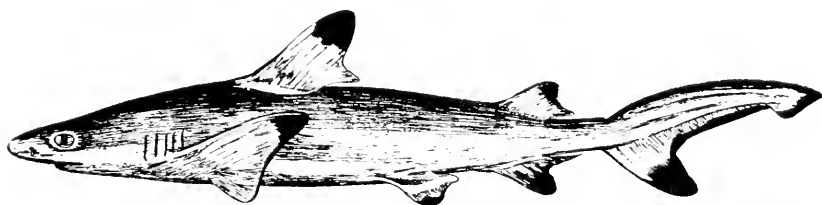
the side of the body from the region of the gills to the base of the ventral fins.

The sand shark is found from the East Coast of Africa eastward through the Indian Ocean and the Dutch East Indies to Hawaiian waters and may possibly even occur in other areas.

Black Finned Sand Shark

Also known as the Mano, Black Shark, or Cub Shark

5-6 *Eulamia melanopterus* (Quoy & Gaimard)



Drawn from Jordan & Evermann

This shark is light brown in color above and white below. It reaches a length of thirteen feet in the open sea, although most specimens are much shorter in length.

Dr. Charles Montague Cooke, Jr., reported that these sharks were "very abundant in the lagoon at Palmyra in 1913. Sometimes as many as six to eight would be swimming around us as we waded in the lagoon, in about 6 to 18 inches of water. Most of these sharks were from two to four feet in length. I think the reason we excited their curiosity was the stirring up of the mud. On two occasions we had them follow us as we were walking on the shoreline. As we waded in the water they continually circled about us, the circles gradually growing smaller. On several occasions they came close enough for us to step on their heads, when they would rush away. We caught six on lines one evening in our bathing pool on fish bait. The only specimen in the museum was a small one taken in a scoop-net, when it approached us."

This shark is very widely distributed in the Indo-Pacific area. It ranges westward through the East Indies and the Indian Ocean as far east as the coast of Africa and eastward through Polynesia as far as the Hawaiian Islands.

Ganges Shark

5-7 *Eulamia gangeticus* (Muller & Henle)

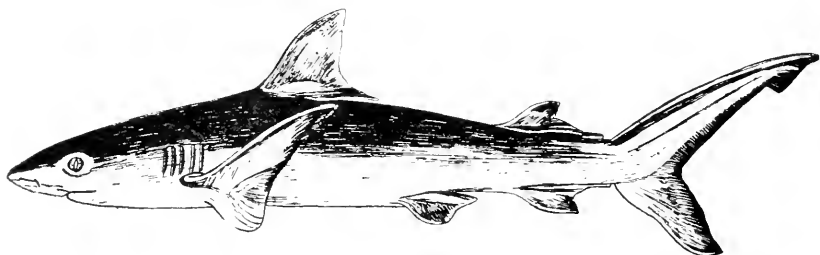
Very little is known about the shark because it is a rare species. It lives in both fresh and salt water and has been reported as common in the mouths of large rivers.

This shark is known to inhabit the waters about India, the East Indies, and Japan. It has also been taken in Fiji and near Laysan Island in the Hawaiian Islands.

Gray Shark

Also known as the Requin or Southern Ground Shark

5-8 *Eulamia commersonii* (Blainville)



Drawn from Jordan & Evermann

This shark has a heavy body which is dark mouse gray in color above. The lower surface of the body is paler in color and is irregularly blotched with dusky markings. The head is blunt in front and the fins are tipped with black. This shark will reach about ten feet in length and will weigh as much as 400 pounds. Most individuals are smaller than this however.

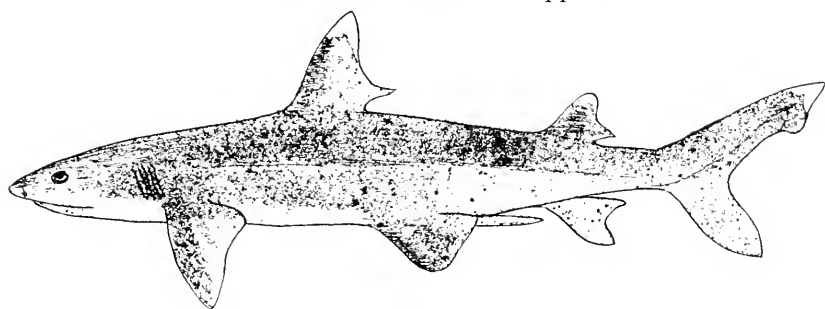
This shark is known to inhabit the warmer parts of the Atlantic Ocean and the Mediterranean Sea. In the Pacific Ocean, it is found from Hawaii through the Line Islands, the Society Islands, and the Fiji Islands to the Kermadec Islands. This shark is reported as the most common species in our Leeward Islands.

Munsing's Shark

5-9 *Eulamia munsing* (Bleeker)

This shark is an East Indian species and is uncommon in Hawaiian waters. It reaches a length of at least five feet. There is a cast in the Bernice P. Bishop Museum of a specimen taken near Honolulu in 1904. Further information on this species may be obtained by consulting Fowler's Fishes of Oceania.

White Tipped Shark

5-10 *Trienodon obesus* (Ruppell)

This shark is a dull colored creature. It may be easily recognized by its obtuse head and by a white tip on the dorsal fins. It has been recorded from the Red Sea to the East Indies, from Tahiti, and from the Leeward Islands of the Hawaiian Archipelago.

THE HAMMER-HEAD SHARK FAMILY

6 Family *Sphyrnidae* (*Centraciontidae*)

This family of sharks is very interesting because its members have a most peculiarly shaped head. The hammer-shaped head of these sharks enables them to be easily and instantly identified. This shark bears two fleshy lobes on its head, one on either side, which extend outward in a lateral direction and which bear the eyes of the shark at their extremities. This modification of the head makes them one of the most unusual groups of fishes known.

The hammer-heads are fairly large sharks with voracious habits and small sharp teeth. They are widely distributed and probably feed on bottom-living fishes.

Of more than five species, two are known from the Hawaiian Islands.

Common Hammer-Head Shark

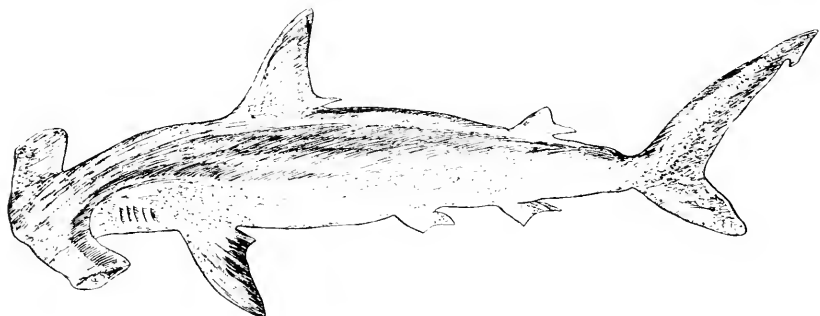
Also known as Mano kihikihi, Mano pahaha, or Strizzle-Nose Shark

6-1 *Sphyrna zygaena* (Linne)

The hammer-head shark is grayish in color above and paler below. It will reach a length of fifteen feet or more and weighs 1,500 pounds.

The hammer-head sharks are active and rapid swimmers when they feel the urge; at other times they swim slowly at the surface, almost

basking. They are voracious in their habits and enjoy a bad reputation. They are thought to feed mainly on bottom dwelling fishes, crabs, squids, and possibly carrion. There are reports of two female sharks which contained thirty-one and thirty-two embryos respectively.



The flesh of these sharks is fine grained and is relished by the Japanese people.

This shark is found throughout all of the tropical and temperate seas of the world. It is common in Hawaiian waters, the South Seas, and in Japan. It is occasionally taken in California.

Hammer-Head Shark

6-2 *Sphyrna tudes* (Valenciennes)

This shark resembles the common hammer-head shark found in Hawaiian waters. It is a circumtropical species and is difficult to identify. It differs from the common hammer-head shark by having a slightly narrower head, no concavity over the nostrils, and by having the nasorial groove short or absent. In color, it is grayish above and pale below. It seems to be a smaller species than the common hammer-head shark. It is known from all tropical seas.

THE DOG SHARK FAMILY

Also known as the Dogfish or Skittle Dog Family

7 Family *Squalidae*

The dogfish sharks are all rather small in size and dull in color. They are a fairly primitive group and still lay eggs in bringing forth their young. In addition to being oviparous, they lack the anal fin the same as the rays do. They may often be recognized by the stout spine on the tail.

The dog sharks are found most commonly in temperate regions. They seem to be more common in the Atlantic Ocean than in any other body of water. They live near shore and are sometimes caught in nets for the oil which may be extracted from them. They are regarded as destructive to herring and to other food fishes.

Three species of this family are known to occur in Hawaiian waters.

Dogfish Shark

Also known as the Pacific Grayfish, Common Dog Shark, or Dogfish
7-1 *Squalus suckleyi* (Girard)



Drawn from Jordan & Evermann

The dogfish shark is a small shark, uniformly brownish or dark slate gray or blue in color above and lighter beneath. Most individuals are less than three feet in length, although they may possibly exceed this size.

The flesh of this fish is edible. Barnhart reports that it is an edible fish in which the flesh is "fine, smooth, and white with an excellent flavor."

A great many of these fishes are caught each year and preserved for biological supply houses to be used by students of zoology.

The dogfish shark is widely distributed in the Pacific Ocean. It is common about Hawaii and is abundant along the coast of California. Curiously enough, it is reported to be abundant in the shallower waters of northern California and is caught only in deep water off southern California.

Hawaiian Dogfish Shark

7-2 *Etmopterus villosus* Gilbert

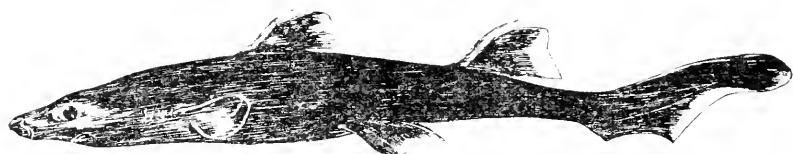


Drawn from Gilbert

This rare shark is known from only one specimen taken off the southern coast of Molokai. It was caught between 222 and 498 fathoms below the surface. The body of this shark was described as a warm brown color above and a purplish black below. The fins were black at the base with whitish edges.

Black Dogfish Shark

7-3 *Centroscyllium nigrum* Garman



Drawn from Gilbert

This little shark is known to science from only three specimens. One was captured near the Galapagos Islands, the other two were taken off the coast of Kauai. The Kauai specimens were taken between 418 and 429 fathoms and between 385 and 500 fathoms respectively.

These little sharks were described as blackish below and shading to light brown above. The fins become lighter in color at their ends. The sharks measured about sixteen inches in length.

THE ECHINORHINID SHARK FAMILY

8 Family *Echinorhinidae* (*Scymnorhinidae*, *Dalatiidae*)

This family of sharks is a small group and its species are nearly all rare. They are consequently not known by any common names.

Three species belonging to this family are known to occur in Hawaiian waters.

Echinorhinid Shark

8-1 *Isistius brasiliensis* (Quoy & Gaimard)

This shark has been described as a dull, vinaceous brown color above and paler below. The pectoral fins are a pale green on their under surfaces. This fish is found in tropical and temperate seas and is known to reach a length of at least sixteen inches.

Echinorhinid Shark

8-2 *Euprotomicrus bispinatus* (Quoy & Gaimard)

This shark is a rare species and very little is known about it. It inhabits the waters from Mauretius on the eastern coast of Africa to New Zealand and has been found in Hawaiian waters.

Cooke's Shark

8-3 *Echinorhinus cookei* Pietschmann

Drawn from Pietschmann

The only known specimen of this rare shark was taken in deep water off the southern coast of Kauai by a fishing sampan. The specimen measured about eighty-two inches and was named for Dr. Charles Montague Cooke, Jr., of the Bernice P. Bishop Museum in Honolulu. The shark was so poorly preserved that an accurate drawing of it is impossible.

THE STING RAY FAMILY

Also known as the Whip-Tailed Ray, Stingaree, or Clam Cracker Family

9 Family *Dasyatidae* (*Tygonidae*, *Dasybatidae*)

The rays are fishes in which the head, body, and the pectoral fins have been depressed to form a broad disk-like body. The tails of these fishes are long and whip-like, although some of the members of the family have a shorter tail which may not be much longer than the body. These tails are nearly always armed on the upper side with one and sometimes two or more saw-edged spines. Since all of these spines are large, jagged, strong, and set on a strong, muscular tail, they are able to inflict very severe and dangerous wounds.

This family of rays includes about fifty species, some of which are large in size. They live in all seas and a few species in South America live in fresh water. Although some do live in colder waters they seem to prefer warmer seas. They live near sandy bottoms where they lie flat feeding on shell fish, crabs, other crustaceans, and fishes. They are ovoviviparous and hatch the eggs within the body of the mother. These rays are seldom eaten as food because their flesh is usually rank and disagreeable in taste and odor.

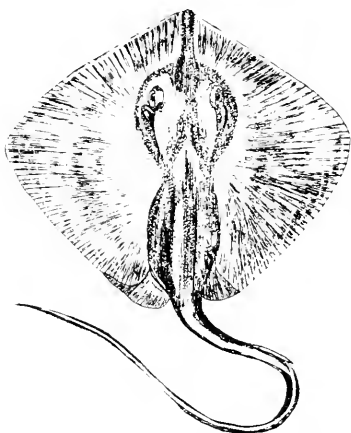
Two members of this family are known from Hawaiian waters.

Lupe

9-1 *Dasyatis latus* (Garman)

This ray fish is a light olive brown color above and white beneath. One specimen caught measured forty-one inches in length of which the body was twelve inches long and the tail twenty-nine inches.

These fishes, when caught and pulled upon the decks of fishing boats, should always be handled with extreme caution because of the damage which they are able to do with their whip-like tail. These creatures when pulled from their watery habitat often thrash about with their tail in an effort to drive the stinger into their captors. Fishermen who are unfamiliar with the habits of these fishes have often been surprised to find that they have paid for their catch with an ugly wound as the result of the dexterity of the tails of these rays.



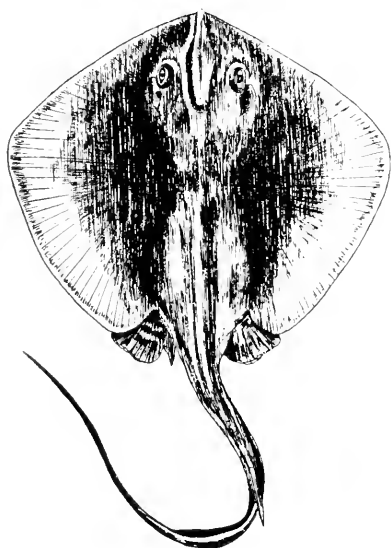
Drawn from Jordan & Evermann

Sting Ray

9-2 *Dasyatis brevis* (Garman)

One specimen of this ray measured about fifty inches across the disc. It is known to inhabit the waters of Peru and California, and has been taken in Hawaiian waters. It is not a common species in this part of the Pacific Ocean.

The spines of sting rays were highly valued by primitive people. In some sections of the Pacific Ocean natives used these spines in making their fighting gear. These spines were mounted on the ends of shafts and served as very effective weapons in their primitive warfare.



Drawn from Jordan & Evermann

THE EAGLE RAY FAMILY

10 Family Myliobatidae (*Aetobatidae*)

This family includes about twenty species of large sting rays inhabiting tropical seas. Their body, head, and pectoral fins are flattened to form a broad disc-like body. In this family, the pectoral fins which form the sides of the body do not unite in front of the head as in other rays. Instead these fins end on each side of the head in a fleshy knob called a "cephalic fin." The tail is very long, slender, and whip-like and contains a small dorsal fin at its base and behind it the usual sharp, serrated spine. The skin is smooth and is usually darker in color above than below.

The teeth of these fishes are very unusual. They are all large and flat and are laid like mosaic to form a tessellated or checkered pavement in each jaw. In addition, the mouth is usually equipped with three rows of narrower teeth on each side. The wide row of teeth on the floor of the mouth extends from the front of the mouth like a spade and is probably used to dig in the clam and oyster beds.

These rays feed principally on molluscs which they dig from beds and crush with their large grinding teeth.

The members of this family are ovoviviparous and hatch their eggs within the body of the mother.

These fishes were named eagle rays because their skull resembles the skull of an eagle.

Of about twenty species in the family, only one is known from Hawaiian waters.

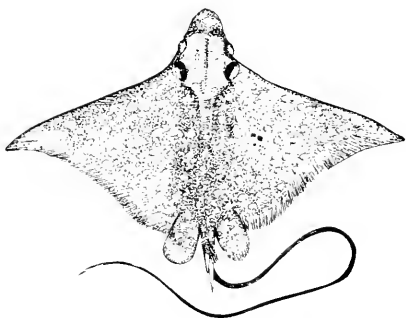
Spotted Eagle Ray

Also known as the Spotted Sting Ray, Spotted Whip Ray, Lupe,
Hihimanu or Ihimanu

10-1 *Aetobatus narinari* (Euphrasen)

The spotted eagle ray reaches a width of six or eight feet and will weigh more than 450 pounds. In color, it is pale greenish or bluish gray above and white beneath. The back is covered with bluish-white, yellowish, or pearly spots and the tail is chocolate brown in color. The teeth of this species form a mosaic on the floor of the mouth and project from it like a spade. The creature is a bottom feeder and uses these strange teeth to pry loose and to crush the clams and oysters on which it feeds.

This fish is ovoviviparous and hatches its young within the body of the mother. It is reported that the mother leaps out of the water at the time the young are born and that the young are thrown from the mother's body while she is leaping. Mr. James Gilbert of Kamehameha Schools reported that a skate leaped into a boat in which he was riding and shortly thereafter gave birth to young measuring from six to ten inches in width.



Drawn from Jordan & Evermann

The flesh of this ray is white and reported to be palatable. Accounts say that it is eaten in the West Indies, India, and in the Hawaiian Islands. In Hawaii, it is reported to have been forbidden to women in olden times; other accounts say that this ray was not eaten by the Hawaiians. Honolulu market men today refuse to buy it.

During 1940, Mr. N. Nakamoto, the fisherman for the Waikiki Aquarium speared a fifty pound individual in Kewalo Basin in Honolulu. The ray, when pulled ashore, exhibited a nubbin in place of its tail. It was later discovered that a year or two previous Mr. Floyd Dwyer of Honolulu captured a small ray in the same vicinity, cut the tail off to insure his safety, and thereafter liberated the sea beast.

This ray is widely distributed in the warmer regions of the Pacific Ocean. It is found from Guam to Hawaii and in Samoa, Tahiti, and the Solomon Islands. It also occurs in Panama Bay and in the West Indies.

THE SEA DEVIL FAMILY

Also known as the Devil Ray or Devil-Fish Family

11 Family *Mobulidae* (*Mantidae*, *Cephalopteridae*)

The sea devils include the largest of the ray fishes. They are reported to reach twenty feet in width and to reach weights variously reported at from 1,250 to 3,000 or 4,000 pounds. They reach an enormous size in warm tropical seas and are among the very largest of the fishes. The body is flat in shape with wide, wing-like fins, and a long whip-like tail. This tail has a single dorsal fin at its base and may or may not have a serrated spine. A pair of fleshy projections from the fins protrude forward

Plate II



1. *Pauu*
2. *Un*
3. *Alaibi*
4. *Alaibi Kabaloa*

5. *Squirrel Fish*
6. *Squirrel Fish*
7. *Un*
8. *Squirrel Fish*

from the sides of the head and stand up like horns or ears on the creature. The eyes are set on the side of the head and the skin is rough to the touch. The mouth is fairly large and is filled with many small, flat, tubular teeth which are set like pavement and in many series.

The sea devils are ovo-viviparous and give birth to their young alive. These fishes make exciting hunting and when harpooned will tow small boats with great rapidity.

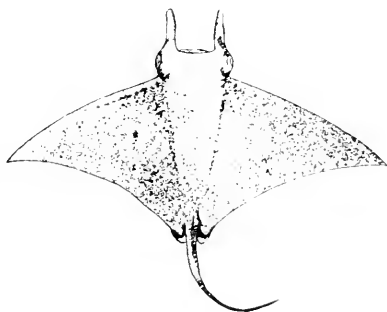
Of about seven known species in this family, two have been recorded from the Hawaiian Islands.

Manta or Hihimanu

Also known as the Sea Devil, Greater Devil Fish, Giant Devil Fish,
or Blanket Fish

11-1 *Manta birostris* (Walbaum)

The manta is reported to reach a width of twenty or twenty-two feet and to weigh as much as 3,000 pounds. The body is nearly twice as wide as it is long and has a long, whip-like tail which is as long as the body. The body is brown above and white beneath and is reported to get darker with age. The skin is rough because of the tubercles which cover it. The anterior edges of the pectoral fins are elongated to form fleshy, horn-like appendages called cephalic fins which extend forward from the sides of the head. The minute, rasp-like teeth are set in the floor of the mouth in rows which cover the entire width of the jaw.



Unlike the rays, the devil fish is not a bottom feeder. It lives at the surface of the water where it swims alone, in pairs, or in small schools. They swim with their cephalic fins pointing forward and with their mouths open. They seem to live upon plankton, small surface-living crustaceans, and surface fishes which they strain from the water with a special branchial device.

The young devil fishes are born alive and are thought by some to be born one at a time. A mother devil fish measuring fifteen feet contained a five foot young weighing twenty pounds.

These fishes have a curious habit of jumping into the air; as they return they strike the water with a terrific noise which may be heard for several miles. This jumping may be associated with the birth of the young.

Although the devil fish eats only small fishes and crustaceans, many fisherman fear the creatures, believing that the devil fish will wrap its wings about them, cuddle them, and finally devour them.

The flesh of this fish is reported to be wholesome and to be eaten wherever the fish is caught.

The giant devil fish is found in all of the tropical seas of the world. They have been taken on the coast of California and in the Hawaiian Islands.

The Japanese Devil Fish

11-2 *Mobula japonica* (Muller & Henle)

The Japanese devil fish is dark brown in color and is reported to grow to a weight of 2,000 or 3,000 pounds. Very little is known of the habits of this fish. It is reported to feed in groups of from three to five individuals and to grunt or to bark when it is out of the water.

It has been recorded from Japan and the Hawaiian Islands.



Drawn from Fowler

THE CHIMAERA FAMILY

Also known as the Elephant Fish, Rat Fish, or Spookfish Family

12 *Family Chimaeridae*

The chimaeras are one of the most interesting families of fishes known because they represent a very ancient and primitive group of fishes. They were apparently a much larger group and much more common in pre-historic times than today for many extinct forms lie buried in the rocks.

The chimaeras live chiefly in the colder waters of the globe and usually at considerable depths, although one species in California is reported to live in the warm surface waters.

The members of this family are oviparous and lay a long, large, ellip-

tical egg case with silky filaments attached to it. The skin of these fishes is smooth.

The chimaera family is of no value as food. They are of interest only because of their ancient pedigree and curious form.

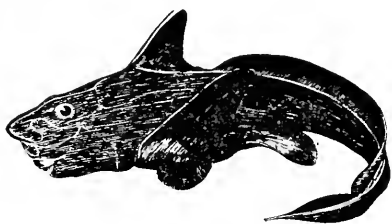
Of seven known species, only one is recorded from the Hawaiian Islands.

Hawaiian Chimaera

Also known as the Elephant Fish or Rat Fish

12-1 *Chimaera gilberti* Garman

This chimaera is of a uniform purplish or plum color throughout and measures about three feet in length. It was taken off the Island of Kauai in deep water between 957 and 1,067 fathoms. Only a single specimen is known.



Drawn from Gilbert

THE TARPON FAMILY

Also known as the Ten-Pounder or Giant Herring Family

13 *Family Elopidae*

The tarpons are large, herring-like fishes with an oblong, somewhat compressed body. Their head is bony and naked, the eyes are large, and the body is covered with large, smooth, silvery scales. In life the tarpons are of a metallic blue color and when viewed in the water look greenish in color.

The young tarpons develop from a rather curious ribbon like larva and pass through a series of stages before finally reaching maturity. Mature tarpons, when considered among fishes as a whole, are of moderate or large size.

Although the tarpon is regarded as one of the best game fishes, its flesh is dry and bony and is not generally regarded as edible. It is eaten by the Hawaiians and by the Japanese.

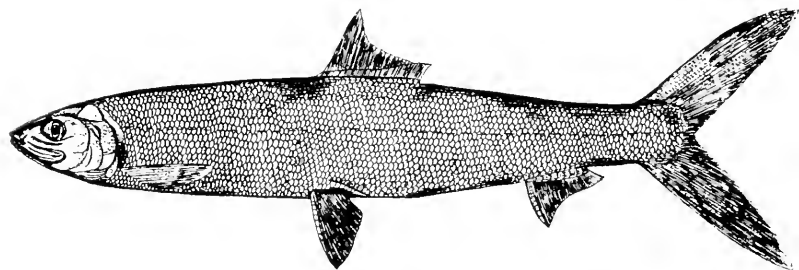
The family is widely distributed in tropical waters, but the species are usually not world wide in their distribution.

One species of this family is known to occur in Hawaiian waters.

Tarpon

Also known as the Ten-Pounder, Jackmariddle, and sometimes erroneously called Awa-awa

13-1 *Elops machnata* (Forsk.)



Drawn from Jordan & Evermann

The tarpon is a large fish reaching a length of six or eight feet and weighing as much as three hundred pounds. Their bodies are elongated and slender and are covered with a sheath of large scales. Most of the members of the family have the last ray of the dorsal and the anal fins developed into a long filament. This species, however, does not possess the filament. In color, the tarpon is uniform bluish above, and silvery on the sides and belly. The tail is forked.

The tarpon is regarded by sport fisherman as one of the best game fishes in the sea. An active and speedy swimmer, it shakes its head when hooked and is somewhat difficult to capture. In Florida waters, it is regarded as the greatest of all game fishes.

The tarpon is reported to live on mullet and to chase them into estuaries. They have the habit of leaping eight or ten feet out of the water and spreading their gill covers. They apparently live in schools.

The tarpon is widely distributed in all tropical seas. It is found in both the tropical Atlantic and Pacific Oceans and occurs in the waters bordering the Hawaiian Islands.

THE BONEFISH FAMILY

Also known as the Ladyfish or Grubber Family

14 Family *Albulidae*

The members of the bonefish family are brilliant silvery fishes of moderate size and are widely distributed in the warm seas of the globe.

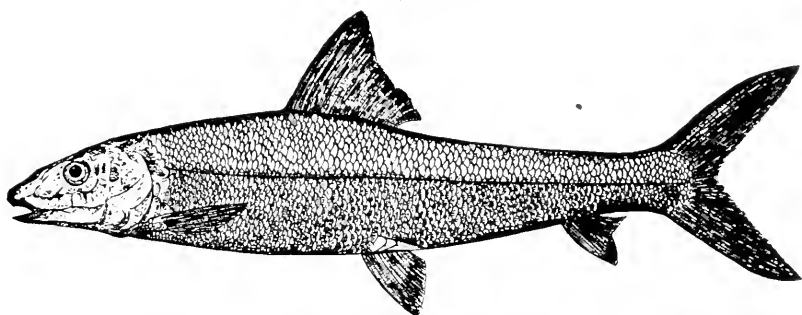
The family contains only two known living forms, one of which is circumtropical.

Bonefish or Oio

Also known as the Ladyfish or Banana Fish and erroneously called Omaka

14-1 *Albula vulpes* (Linne)

Plate III, Figure 12



Drawn from Jordan & Evermann

The bonefish is a brilliant silvery or steel bluish color above and bright silvery on the sides and belly. The back and sides of this fish are sometimes marked with faint streaks along the rows of scales. It will reach a length of from eighteen inches to three feet and, although alert and strong, is reported to be weaker than the tarpon. The head is somewhat wedge shaped and has a pointed snout which overhangs the mouth. Their teeth are blunt and rounded and the eyes appear to be nearly covered with a thick transparent membrane.

The bonefish has a larval stage somewhat like the conger eels in which the young are long and band shaped with small heads and loose, transparent tissue. Before the larvae begin to grow they will first shrink from three and one-half to two inches and thereafter grow more and more like the adult. It is reported that along the coast of the Gulf of California these young bonefish are sometimes thrown upon the beaches in large numbers by storms.

The bonefishes live in tropical seas and are most common along sandy coasts. They are widely distributed in the oceans of the world and are usually abundant wherever they occur. They occasionally form large schools which may be caught by clever fishermen. They seem to like to enter shallow water and will swim over low tide flats searching for food with the incoming tide. They seem to eat shellfish, worms, and crusta-

ceans, which they gather from the mud and crush with the aid of their pavement like teeth.

In Florida waters, they are considered a good game fish because they are beautiful and active. Although bonefish are not highly valued as food, they are nevertheless eaten.

THE MILK FISH FAMILY

15 Family *Chanidae*

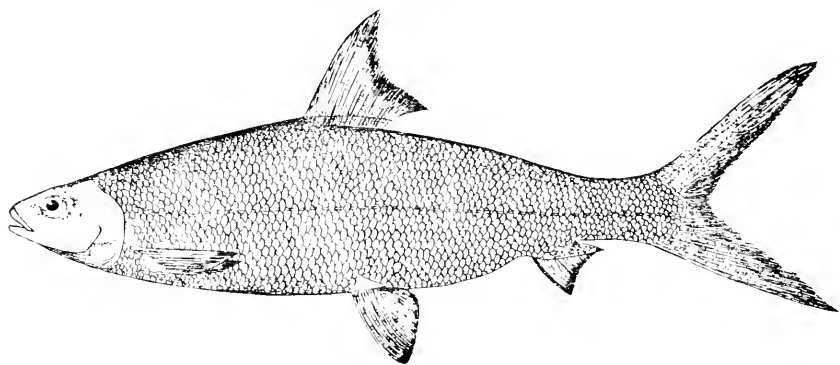
The family of the milk fishes is a small group of ancient origin. They are a brilliant silvery color, quite large, and have small scales and no teeth.

Milkfish are abundant in the Gulf of California, Polynesia, and throughout the Indo-Pacific area.

Only one species is known to occur in Oceania. Further study may reveal that the family consists of but a single species.

Milkfish or Awa

15-1 *Chanos chanos* (Forsk.)



Drawn from Jordan & Evermann

The entire body of the milkfish has a brilliant, metallic color. It is silvery-bluish or grayish-green above, silvery on the sides, and white beneath. It reaches a length of from two to five feet and has a small, toothless mouth. The scales which cover the body are hard and silvery and were used by different peoples as ornaments. It is most easily recognized by its widely forked tail.

The awa is one of the most important food fishes in the Hawaiian Islands. It is next to the mullet the most abundant species frequenting the walled fish ponds. Like the mullet, it is run with the tide into the fish ponds and there confined while it grows to maturity.

Like most other fishes the Hawaiians gave it different names at different ages. The young were called puawa, medium sized individuals were called awa-awa, commercial fish were called simply awa, while the very large fish were called awa kalamoku.

The awa is a very good food fish. It is a disappointment to fishermen because it will not bite fishing tackle.

The milkfish is distributed throughout the Pacific and Indian Oceans and is common in the Hawaiian Islands. It is a shore fish and prefers to live near sandy bottoms.

THE SAND EEL FAMILY

16 Family *Gonorbhynchidae*

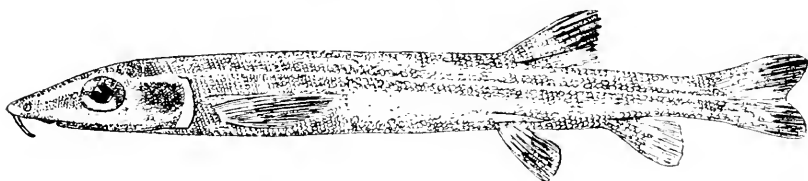
The sand eels are a small family of primitive fishes. They are all of moderate size with elongated cylindrical bodies which are covered with spiny scales. Their mouths are small and their teeth are weak.

All of the living members of the family are marine. They are semi-pelagic and are reported to extend more or less into sub-tropical waters.

Only one member of this family is known from the Hawaiian Islands.

Sand Eel

16-1 *Gonorbhynchus gonorbhynchus* (Linne)



This sand eel is a pale, sandy grey color above and white on the lower surface of the body. It is reported as a dainty little fish and reaches a length of at least ten inches.

It is known to occur about South Africa, Australia, New Zealand, Japan, and the Hawaiian Islands.

THE TRUE HERRING FAMILY

Also known as the Round Herring or Great Herring Family

17 Family *Clupeidae*

The herring family contains more than 150 known species. Of these, several groups are widely distributed. The herrings live in all seas and

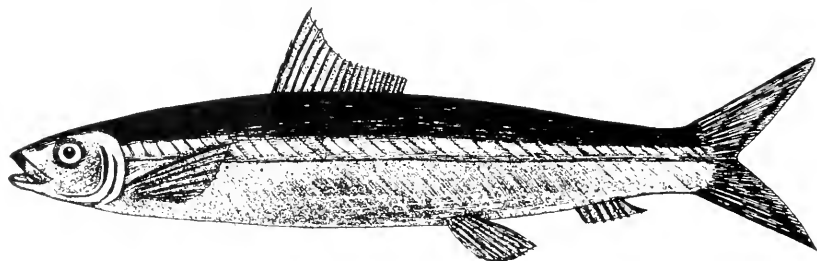
swim in immense schools. Some of the members of the family live in fresh water, some live in the sea and go into fresh water to spawn, but the great majority spend their entire life in the ocean. The species which swim in large schools are of value as food fish and are caught in large numbers.

Of more than 150 known species, only two are known from the Hawaiian Islands.

Round Herring

Also known as the Japanese Herring or Makiawa

17-1 *Etrumeus micropus* (Schlegel)



The makiawa is a bright, silvery, steel-olive color above. The sides of the body are slightly yellowish and the belly is silvery. Each scale has a diamond-shaped olive spot upon it; these spots form lines along the rows of scales. The eyes are covered with a transparent thickened membrane. This fish measures from three to ten inches in length.

The makiawa is widely distributed in the Pacific Ocean. It is found from Japan through Hawaiian waters to California.

Small Round Herring

17-2 *Stolephorus delicatulus* (Bennett)

This little herring ranges from two and one-half to four inches in length. It is of slaty color on its back and silvery white beneath. The fins are pale in color. It is found in the waters adjacent to Mauritius, the East Indies, Australia, Oceania, Tuamotu, and in Hawaii and its leeward island groups.

THE ANCHOVY FAMILY

18 Family *Engraulidae*

The family of the anchovies includes a number of small, weak, carnivorous shore fishes. Many of the species are easily recognized by a bright

silvery lateral band on their body. These little fishes live in immense schools in warm seas. They swim along the shore and sometimes enter the mouths of rivers.

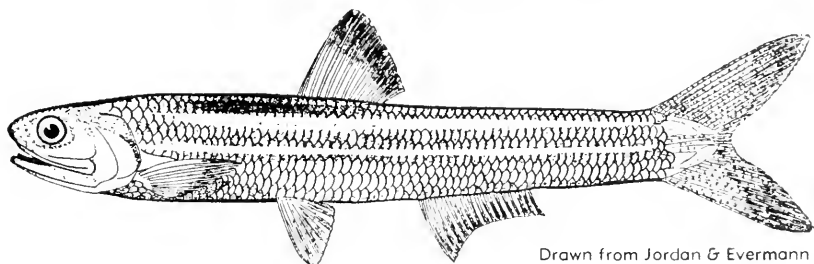
The anchovies are of value because they furnish food for larger fishes and because they provide fish for human consumption. Because they live in large schools, they are caught wholesale and made into fish paste and preserved in oil. Their flesh is oily and tender.

Only one member of this family is native to the Hawaiian Islands.

Anchovy or Nehu

Also known as Nehu kulana, Nehu pakii, Nehu maoli, and Nehu pala

18-1 *Anchoviella purpureus* (Fowler)



Drawn from Jordan & Evermann

The nehu may be recognized by the fact that it has a broad, silvery band down the side of the body as wide as the eye. The dorsal fin contains faint crossbars and the tail contains a series of small pale dots. This species reaches a length of about two and one-half inches.

This fish has been dried for food in time past although today its use as food is forbidden by law. The commercial catch in 1900 was 90,000 pounds. Today the nehu is widely used as a bait by commercial tuna fishermen.

This fish is known only from the Hawaiian Islands.

Japanese Anchovy

18-2 *Cetengraulis mysticetus* (Günther)

The Japanese anchovy is olivaceous in color above. The sides of the body and the belly are silvery in color. The young fishes are marked with a silvery lateral band, which disappears as the fish reaches about three inches in length. This anchovy, when full grown, will reach a length of six inches. This fish is found along the Pacific coast of Central America and is reported from Japan.

The Board of Agriculture and Forestry of the Territory of Hawaii has undertaken to introduce this little fish into Hawaiian waters in an effort to provide more bait fishes for the tuna industry.

THE SALMON AND TROUT FAMILY

19 Family *Salmonidae*

The members of this family are an unusual and interesting group of fishes. They are of great importance to us because of their food, their beauty, and their game fishing qualities.

They nearly all have oblong bodies with rounded bellies, a naked head, a body covered with cycloid scales, no barbels, a forked caudal fin, about sixty vertebrae, and most unusual of all—an adipose fin. This last character alone is almost sufficient to identify the members of the family.

The members of this family live in both salt and fresh water and have very interesting histories. Some of the members live in the sea and lay their eggs in fresh water, others live in deep lakes and spawn in shallow water and streams, while still others live in streams and brooks. They also vary from gamy, voracious fishes to docile, defenseless species.

A recent family, geologically speaking, they are confined to the North Temperate Zone and number about one hundred species.

A few members of this family have been introduced into Hawaiian waters.

Rainbow Trout

19-1 *Salmo species*

The streams of the Island of Kauai were stocked several years ago by one of the several species of trout. They seem to have become well established and are now taken by fishermen in the streams of that island.

The exact identity of this trout has not been determined because many of the species look nearly alike and are difficult to identify.

Both salmon and trout have been introduced into the streams of the Hawaiian Islands at different times. Jordan reports that "in 1876 some salmon and trout eggs were sent to Honolulu by the California Fish Commission in exchange for 100 awas (milk fish), which it was designed to plant in California waters." There is no record of the outcome of the experiment.

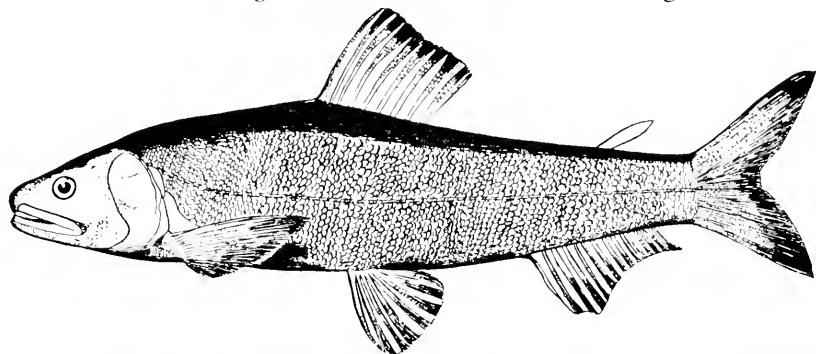
The streams in the Hawaiian Islands are not well suited to salmon and it is very doubtful if they will thrive here.

THE AYU OR SWEETFISH FAMILY

20 Family *Plecoglossidae*

The single member of this family is often placed in the family with the salmon and trout. This fish resembles a small trout in form and like them runs up fresh water streams.

Ayu or Sweetfish

20-1 *Plecoglossus altivelis* Temminck & Schlegel

The sweetfish, as its name implies, is one of the finest of food fishes. It reaches a foot in length and is found in Japan, Hokkaido, Formosa, and Korea.

The eggs of this fish were introduced into Kalihi pool on Oahu by Dr. Chiyometsu Ishikawa during the 1920's. Since the fishes have not been reported since their introduction, it is probably safe to assume that they did not survive.

THE STOMIID FISH FAMILY

21 Family *Stomiidae* (*Stomiatidae*)

The fishes which make up this strange family are all found in deep water. Like many other deep sea fishes, they have voracious habits, large mouths with fang-like teeth, and large eyes which are directed forward. Their bodies are long and tapering.

Two species of this family are known from Hawaiian waters.

Stomiid Fish

21-1 *Stomias boa* (Risso)

This deep sea fish is called bathypelagic—meaning that it is a free moving species living at considerable depths. It is found in both the Atlantic and Pacific Oceans. It will reach a length of twelve inches.

Stomiid Fish

21-2 *Leptostomias macronema* Gilbert

This fish is known from a single specimen taken off the coast of Niihau in the Hawaiian Islands. It is a deep sea fish and was taken in a dredge between 319 and 451 fathoms.



Drawn from Gilbert

It measured about three inches in length and was jet black in color. It was a slender fish with a barbel almost one-half as long as its body trailing from its chin.

THE ASTRONESTHID FISH FAMILY

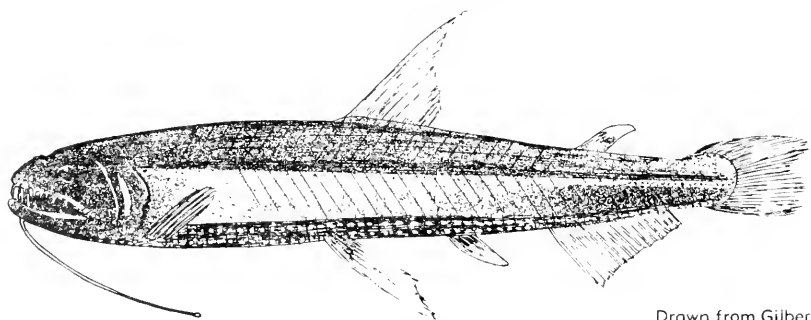
22 Family *Astronesthidae*

The fishes of this family are all inhabitants of the deep sea. They have scaleless bodies and long canine teeth. The sides and bellies of these fishes have many small luminous spots. The family is small and has only a few species.

One member of this family is known from the Hawaiian Islands.

Astronesthid Fish

22-1 *Astronesthes lucifer* Gilbert



Drawn from Gilbert

This deep sea fish is brownish black above and black below. The sides are silvery grayish and the fins are translucent. This fish measures about three inches in length. Individuals have been taken off the coast

of Kauai between 368 and 1,021 fathoms and off the south coast of Oahu between 257 and 294 fathoms.

This fish is found from the East Indies to the Hawaiian Islands.

THE VIPER FISH FAMILY

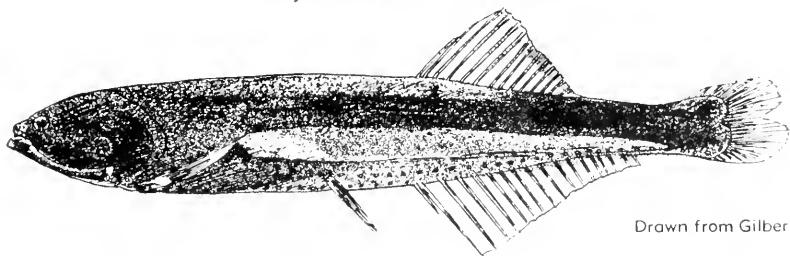
23 Family *Gonostomidae*

The viper fishes are small deep sea fishes with large mouths and voracious habits. They are usually small in size and are quite feeble and fragile. They live in the ocean depths.

Three species of this family have been found in the deep water surrounding the Hawaiian Islands.

Viper Fish

23-1 *Cyclothone canina* Gilbert



Drawn from Gilbert

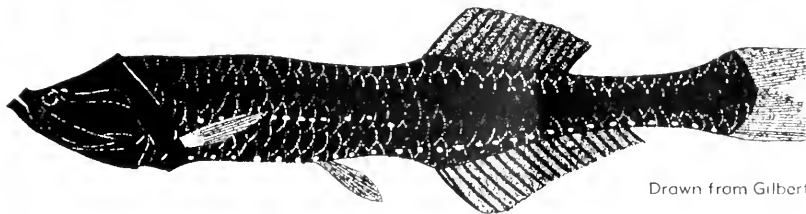
This viper fish is dark brown on the back and sides of its body, while the sides of the head and the abdomen are black in color. This fish measures about three inches in length.

It is known only from the Hawaiian Islands and is never caught in less than 400 fathoms of water.

It is a true bathybial form and does not live on the bottom.

Viper Fish

23-2 *Cyclothone atraria* Gilbert



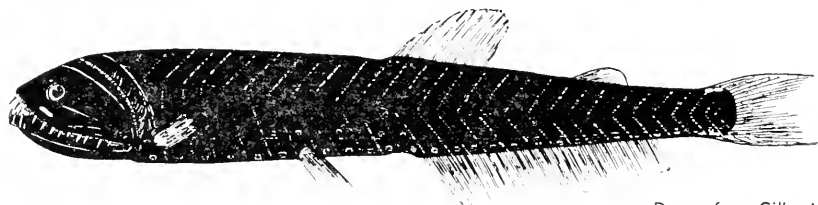
Drawn from Gilbert

This viper fish looks much like the preceding species. It is uniformly black over the entire body and measures about three inches in length.

A specimen was taken off Kauai in 1902 between 508 and 703 fathoms.

Viper Fish

23-3 *Gonostoma rhodadenia* (Gilbert)



Drawn from Gilbert

This little viper fish is brownish black above and jet black beneath. It measures about eight inches in length and was taken in a dredge off Kauai between 409 and 550 fathoms and also in Kaiwi Channel between 411 and 442 fathoms.

This fish is found from the East Indies to the Hawaiian Islands.

THE MAUROLICID FISH FAMILY

24 Family *Maurolicidae*

The fishes which belong to this family are all deep sea creatures. They have elongated, scaleless bodies and contain many luminous spots.

Two species are known from Hawaiian waters.

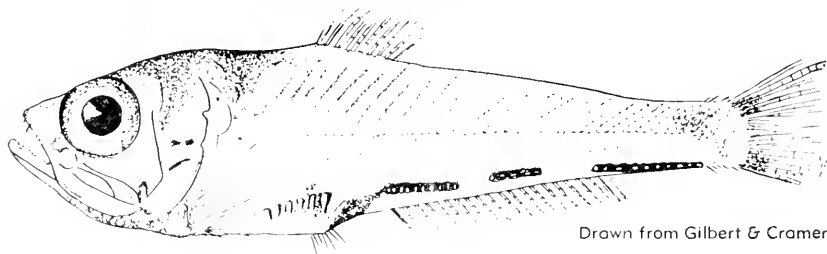
Maurolicid Fish

24-1 *Vinciguerria attenuata* (Cocco)

This fish reaches a length of about three inches. It is distributed in all of the tropical waters of the globe. It has been taken northeast of Hawaii.

Maurolicid Fish

24-2 *Argyripnus ephippiatus* Gilbert & Cramer



Drawn from Gilbert & Cramer

This fish, measuring about four inches in length, was taken along the north coast of Maui between 267 and 283 fathoms. It was also taken along the northwest coast of Oahu between 216 and 251 fathoms.

THE STERNOPTYCHID FISH FAMILY

25 Family *Sternoptychidae*

The fishes which belong to this family are deep sea dwellers. However, during the night and in times of stormy weather, they will rise toward the surface. Their short, deep body is compressed and distorted in form. The teeth are small and the body which is bright silvery in color is covered with luminous spots.

Four species of this family are known from Hawaiian waters.

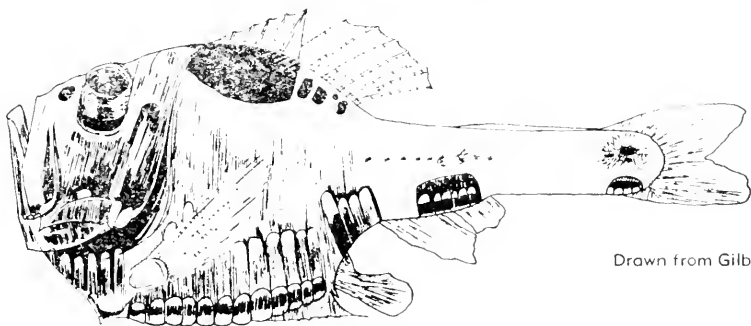
Sternoptychid Fish

25-1 *Sternoptyx diaphana* Hermann

This fish reaches a length of about two inches. It is widely distributed in all tropical seas. It has been taken off Molokai, Oahu, Kauai, in Kaiwi Channel, and off Bird Island (Nihoa) in depths ranging from 294 to 1,594 fathoms.

Heath's Fish

25-2 *Argyropelecus heathi* Gilbert



Drawn from Gilbert

The head and trunk of this rare little fish are blackish in color. The middle of the trunk has a silvery sheen. The snout and mandibles are reported as translucent. One of the most interesting features of the little fish are its telescopic eyes. It measures only a little more than one inch in length.

Only two specimens of this fish are known. One was caught in Kaiwi Channel between Oahu and Molokai between 350 and 355 fathoms. The other was taken near Kau, Hawaii.

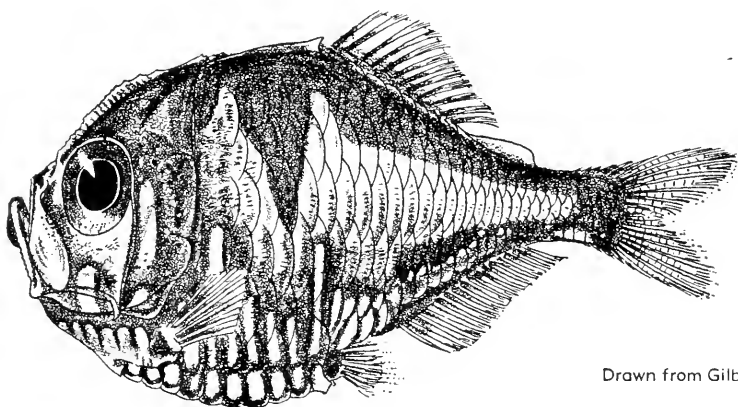
Sternoptychid Fish

25-3 *Diplophos pacificus* Gunther

This little fish was taken in the Pacific Ocean east of Hawaii at 5° N. and 147° W. It measured about one and one-half inches and was described as brownish in color with a silvery lustre.

Nutting's Fish

25-4 *Polyipnus nuttingi* Gilbert



Drawn from Gilbert

This little fish is dark brown in color above while the abdomen is purplish, silvery and blackish. Each side of the body is marked by a wide, silvery stripe.

The stomach of the fish was full of *Globigerina* and other Foraminifera. It appears to be a bottom living form. It was named for Professor C. C. Nutting of the University of Iowa.

This fish is known only from the Hawaiian Islands. It was taken in Pailolo Channel between 284 and 308 fathoms, off Oahu between 216 and 280 fathoms, and off Kauai between 225 and 324 fathoms.

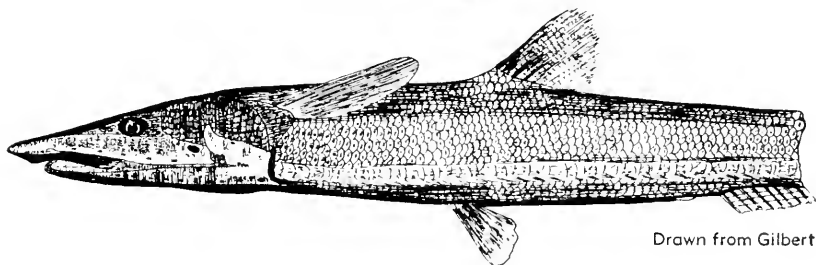
THE HALOSAURID FISH FAMILY

26 Family Halosauridae

This family of fishes is confined to the deep sea. They have elongated bodies which are compressed in front and which taper to a long slender tail.

Three species of this family are known from the Hawaiian Islands.

Kauai Halosaurid

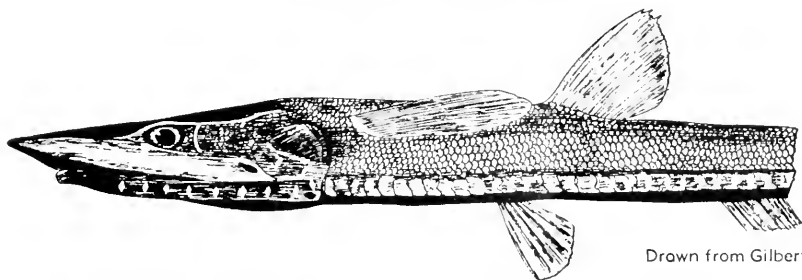
26-1 *Halosauropsis kawaiensis* Gilbert

Drawn from Gilbert

This fish is dark brown in color on both the back and sides and the body is marked by large scales along the lateral line. It measures almost thirty inches in length.

It was taken along the north coast of Molokai, off Bird Island (Nihoa) and off Kauai in depths ranging from 385 to over 876 fathoms.

Halosaurid Fish

26-2 *Halosauropsis verticalis* Gilbert

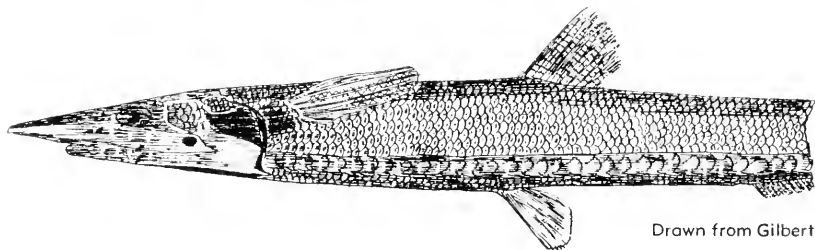
Drawn from Gilbert

This fish is brownish black on the sides and back, while the head and lower side of the body are a deep blue-black color. The head of the fish is almost scaleless. The fish measures about one foot in length.

It was taken off Kauai and Bird Island (Nihoa) in depths of from 313 to 800 fathoms.

Halosaurid Fish

26-3 *Halosauropsis proboscidea* Gilbert



Drawn from Gilbert

This fish measures about eighteen inches in length and was reported to be a light grayish-brown color with a faint bluish tinge.

It was taken in Kaiwi Channel between Molokai and Oahu and off Kauai between 438 and 476 fathoms.

THE SYNAPHOBRANCHID FISH FAMILY

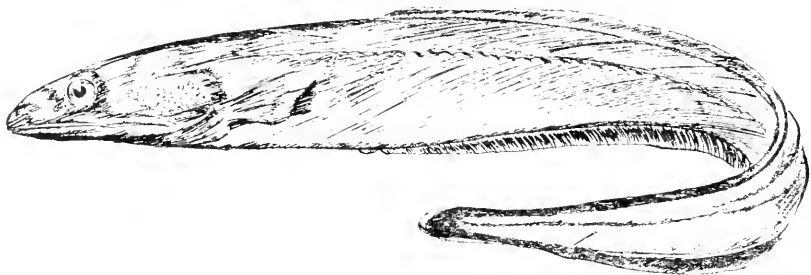
27 Family *Synphobranchidae*

The members of this family are all deep-sea, eel-like creatures with long, pointed heads, small sharp teeth, and rudimentary scales. They are slender creatures and make their home in the ocean depths.

Only one species of this family is known from the Hawaiian Islands.

Synphobranchid Fish

27-1 *Synphobranchus brevadorsalis* Gunther



Drawn from Gilbert

This fish is described as being warm brown in color with margins of white along its fins. It was described as a strange looking fish resembling an eel.

It is known from New Guinea, Japan, and the Hawaiian Islands.

The Hawaiian specimens were taken off Kauai, Bird Island (Nihoa), and Oahu between 222 and 800 fathoms.

THE PIKO EEL OR PIKE EEL FAMILY

28 Family *Muraenesocidae*

The piko eels are all of large size with long, slender snouts and strong, knife-like teeth. The canine teeth of this family are reported to be prominent.

Only one specimen of this family was ever recorded from the Hawaiian Islands.

Piko Eel

28-1 *Muraenesox arabicus* (Schneider)

This piko eel reaches a length of forty inches. It occurs off India, the East Indies, Java and the Hawaiian Islands.

The only Hawaiian specimen known was killed by the Mauna Loa lava flow of 1919.

THE CONGER EEL FAMILY

29 Family *Congridae* (*Leptocephalidae*)

The conger eels are most easily recognized by the fact that they have pectoral fins, but no pelvic fins. In color they are usually grayish above and whitish beneath and are reported to reach a length of six or eight feet. The largest conger on record was reported from London, September 17, 1904. It was supposed to have weighed 160 pounds and measured nine feet in length. The bodies of these eels are long and tapering and the unpaired fins are joined to form one continuous fringing fin running from the head around to the anus. The species are mostly large and are all marine; they do not enter fresh water. Although the conger eels resemble fresh water eels, they are without scales and have a somewhat different mouth.

The conger eels lay larger eggs than other eels and usually many more. They are reported to deposit as many as 3,000,000 at a single spawning. These eggs hatch into transparent ribbon-shaped larvae (*Leptocephalus*) which have small heads. These larvae are loose and watery at first but grow solid as they grow older.

The conger eels are active at night. They feed on fishes, cuttlefish, crustacea, and worms.

The flesh of these eels is white and is valued as food. It is commonly sold on island markets and brings a good price.

The Hawaiians gave the name of *puhi* to all eels and affixed a second word to designate the particular species. We might mention that '*anau ki*' referred to the young of all eels.

Eight species of conger eels are known from the Hawaiian Islands.

Conger Eel

Also known as the Puhi uha (slippery eel) or Puhi ula (Red eel)

29-1 *Conger cinereus* Ruppell

This eel is described as olivaceous brown in color above and whitish beneath. It reaches a length of about forty inches. It makes its home among lava rocks and is usually abundant there.

It is known from the Red Sea to the East Indies, and eastward through Samoa, the Society Islands and Christmas Island, to the Hawaiian Islands and their leeward chain.

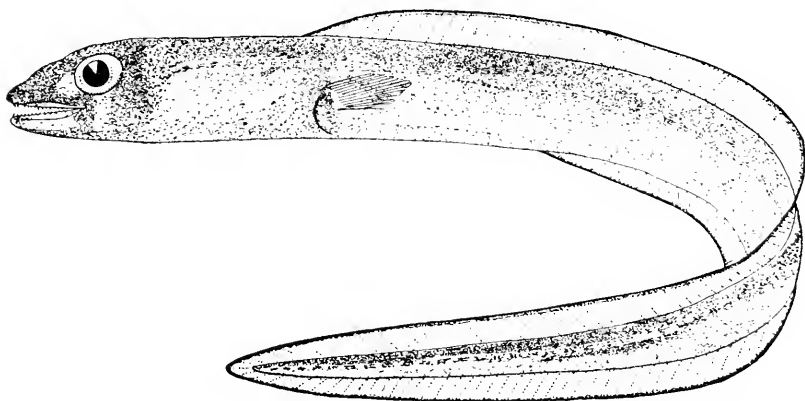
Wilson's Conger Eel

29-2 *Conger wilsoni* (Schneider)

This conger eel was described as uniformly dark brown in color. It measures as much as five feet in length. It is known from New Holland and from the Hawaiian Islands.

Bowers' Conger Eel

29-3 *Ariosoma bowersi* (Jenkins)



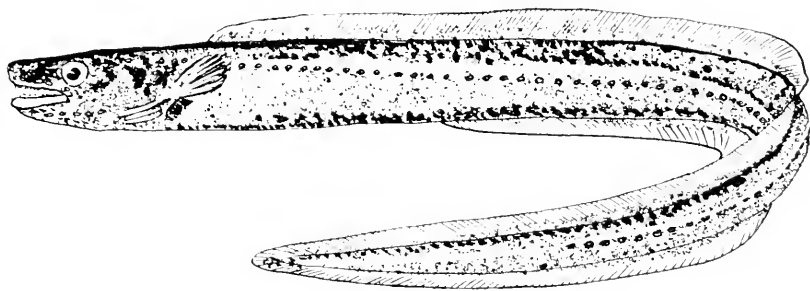
Drawn from Jordan & Evermann

This conger eel is pale brown in color above and lighter below. The dorsal, anal, and caudal fins have a narrow black border. It will reach

a length of fourteen inches. It is known from the Gilbert Islands and from Hawaii and its leeward chain.

Conger Eel

29-4 *Conger guttulata* (Gunther)



Drawn from Gilbert & Cramer

This conger eel was dredged off Oahu and off Kauai in from 164 to 469 fathoms of water. It is known from Fiji, Samoa, and the Hawaiian Islands.

Nuttall's Conger Eel

29-5 *Leptocephalus nuttalli* (Fowler)

This eel is known only from a larval specimen collected in Hawaiian waters. Its adult identity is not known.

Conger Eel

29-6 *Leptocephalus species*

A specimen measuring about four inches in length was caught off Pearl and Hermes Reef. It was a larval form and was never identified.

Alcock's Conger Eel

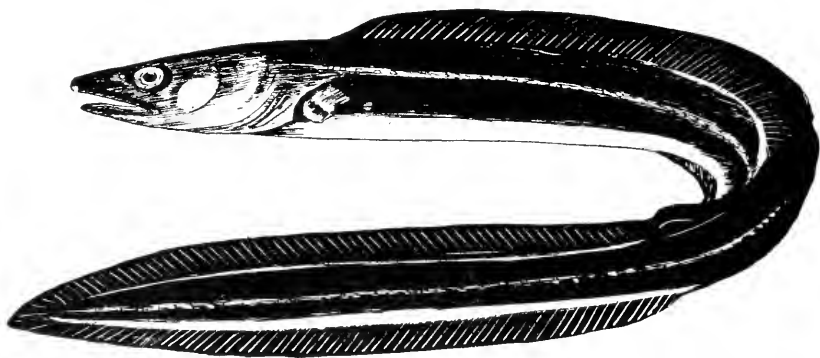
29-7 *Promyllantor alcocki* Gilbert & Cramer



Drawn from Gilbert & Cramer

This eel is known only from Hawaii. It is a rare species and was taken in deep water between 238 and 334 fathoms.

Conger Eel

29-8 *Veternio verrens* Snyder

Drawn from Jordan & Evermann

This eel measured about two feet in length and was described as brown when preserved in alcohol. It has a long pointed head. It is very rare and is known only from Hawaii.

THE DUCK-BILLED EEL FAMILY

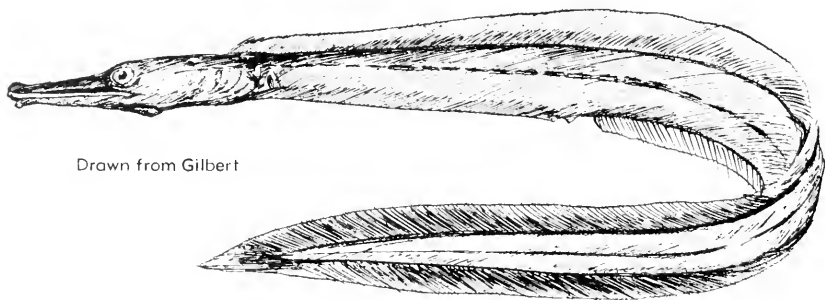
Also known as Sorcerers

30 Family *Nettastomidae*

The duck-billed eels are a connecting link between the real eels and the snipe eels which live in the ocean depths. These eels have fragile bodies and are without pectoral fins. Their skin is thin and contains a black pigment. The duck-billed eels all live in moderately deep water. There are only a few species in the family.

One species of this family has been recorded from Hawaiian waters.

Duck-billed Eel

30-1 *Metopomycter denticulatus* Gilbert

Drawn from Gilbert

This rare eel had a slender head and body, a tapering tail, and a flattened snout. It measured about thirty inches in length and was of an olive brown color. The only specimen known of this species was taken in a dredge off Kauai between 409 and 550 fathoms.

THE WORM EEL FAMILY

31 Family *Echelidae* (*Myridae*)

All of the members of this family are small, worm-like creatures. They have the tail surrounded by a fin, suggesting that they are related to the conger eels.

Two species of this family are known from Hawaiian waters.

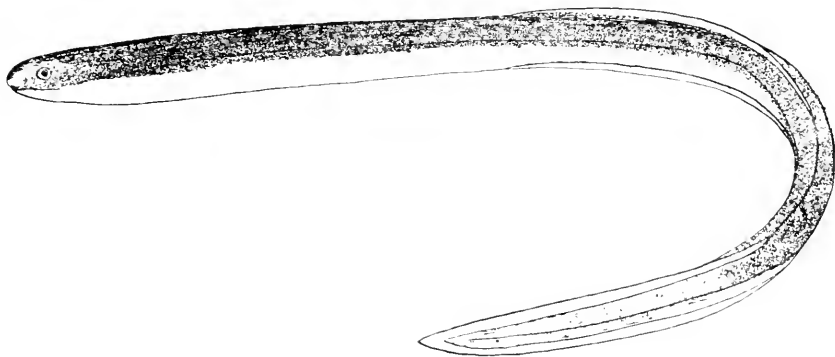
Worm Eel

31-1 *Muraenichthys gymnopterus* (Bleeker)

This eel is dull brown in color and measures as much as ten inches in length. It is known to occur about Japan, Java, the East Indies, and in Hawaiian waters.

Cooke's Worm Eel

31-2 *Muraenichthys cookei* Fowler



Drawn from Fowler

This rare eel was reported to be brown or tawny olive on its back and upper surface. The under surface and the fins were reported as paler in color. The only specimen known measured about eight inches in length and was caught off Oahu.

This eel was named for Dr. Charles Montague Cooke of the Bernice P. Bishop Museum in Honolulu.

THE SNIPE OR THREAD EEL FAMILY

32 Family *Nemichthyidae*

The snipe eels have long and slender bodies which taper toward the tail and end in a long filament at the end of the body. The body also tapers forward to a small neck to which is attached the head. They are nearly all translucent fishes with no scales upon their bodies. Their jaws are long and slender and in some species are recurved so that they cannot be closed. They are reported to be very snake-like in appearance and to swim with swift undulations, often near the surface. Their home seems to be in the ocean depths.

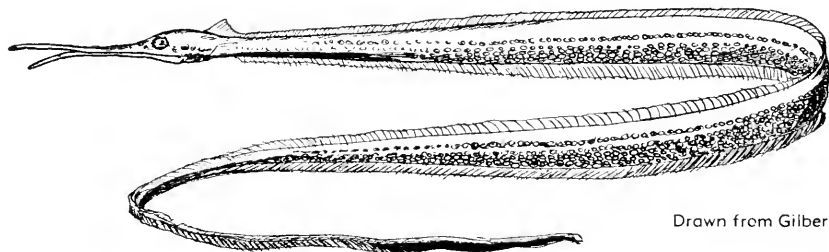
Four species of this family are known from the Hawaiian Islands.

Snipe Eel

32-1 *Nemichthys scolopaceus* Richardson

This fish reaches five feet in length. It is a bathypelagic form and lives in the ocean depths. It is known to occur in the south Atlantic Ocean and in the Pacific Ocean northward of New Guinea.

Spotted Snipe Eel

32-2 *Nematoprora polygonifera* Gilbert

Drawn from Gilbert

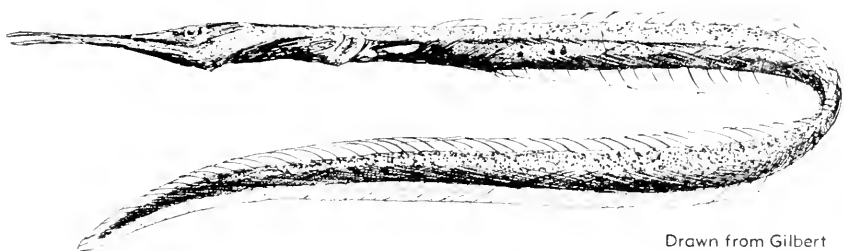
This rare eel measured about one foot in length. The upper half of the body was whitish in color, while the lower half of the body was covered with blackish spots each with a whitish center. Only one specimen of this eel is known. It was taken near Bird Island (Nihoa) from between 313 and 800 fathoms.

Bean's Snipe Eel

32-3 *Serrivomer beanii* Gill & Ryder

This rare eel was taken off Oahu, Bird Island (Nihoa), and off Kauai between 311 and 1,067 fathoms. It is also thought to occur along the Pacific coast of Mexico and Central America.

Snipe Eel

32-4 *Stemonidium hypomelas* Gilbert

Drawn from Gilbert

The body of this eel is long and slender and tapers from its middle toward the tail and neck. The head is slightly larger than the neck and contains long, slender jaws. The upper half of the body is grayish in color and covered with fine black specks. The head and the tail are entirely black.

The only specimen known was taken in a dredge near Niihau between 537 and 672 fathoms.

THE SNAKE EEL FAMILY

33 Family *Ophichthyidae*

The family of the snake eels contains about 100 species. They are easily recognized by the fact that they have no caudal fin. In these fishes the tail projects beyond the dorsal and anal fin to end in a firm point. These eels are brightly colored and superficially resemble snakes. They have no scales on their bodies.

All of the members of the family are of small or moderate size. They are abundant about coral reefs in all tropical seas.

Of more than 100 known species, seven are recorded from Hawaiian waters.

Snake Eel

33-1 *Stethopterus semicinctus* (Lay & Bennett)

This snake eel has a slender, fairly-rounded body and tapers to a tail which ends in a conical horny point. The tip of the snout and the tail are white, while the remainder of the body shades into a yellowish brown. The body is crossed by from 24 to 27 deep brown, broad cross bands which are placed saddle fashion on the body. The creature measures about eighteen inches in length.

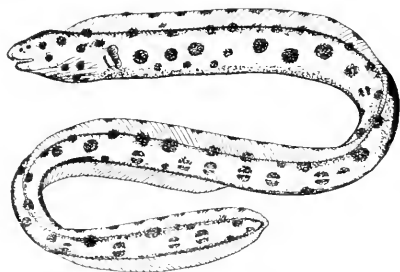
This eel is widely distributed. It is found from the East Indies eastward to the Society Islands, along the coast of China and Japan, at Guam, the Line Islands, and the Hawaiian Islands.

The Spotted Snake Eel or Puhi Laau

33-2 *Myrichthys maculosus* (Cuvier)

This eel measures about two feet in length and is described as a light olive color in alcohol with round brown spots on the body. The fins have a narrow white margin.

This eel is widely distributed. It is found from the Red Sea and Madagascar through the East Indies, New Guinea, Fiji, Polynesia, Guam, and the Hawaiian Islands.



Drawn from Jordan & Evermann

Marbled Snake Eel

33-3 *Callechelys marmoratus* (Bleeker)

This eel is whitish in color and is speckled and blotched with brownish black. It reaches a length of two feet and is known to swim at the surface of the water.

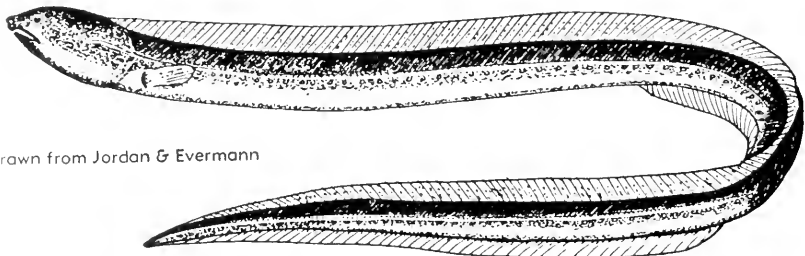
This fish is known from Mauretius eastward through the East Indies, Melanesia, Micronesia, and Polynesia as far northward as the Hawaiian Islands.



Drawn from Jordan & Evermann

Snake Eel

33-4 *Ophichthus calamus* Gunther

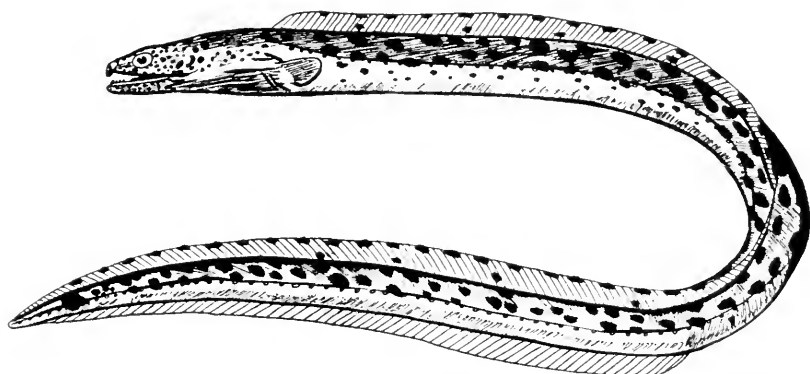


Drawn from Jordan & Evermann

This snake eel is brownish in color above and is covered with minute black dots. The body is uniformly pale whitish in color beneath. It reaches a length of twenty inches.

Snake Eel

33-5 *Ophichthus polyophthalmus* Bleeker



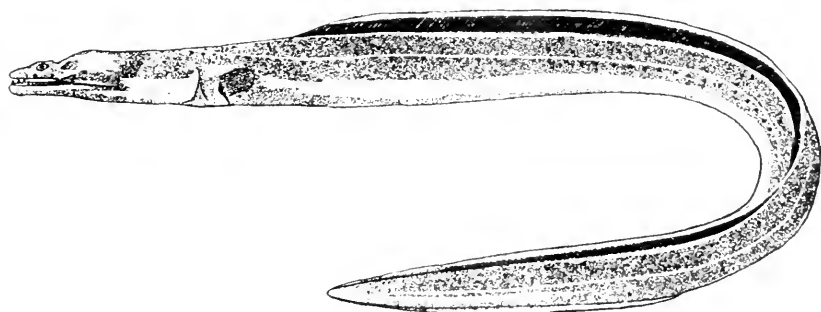
Drawn from Jordan & Evermann

This snake eel is whitish in color. The back and the upper surface are covered with round brown spots. The pectoral fins and the end of the tail are yellow. It measures about two feet in length. It is known from the East Indies, Riu Kiu, the Society Islands, and the Hawaiian Islands.

Henshaw's Snake Eel

33-6 *Brachysomophis henshawi* Jordan & Snyder

This snake eel has a cylindrical body which is grayish in color with a yellowish tint and a few brown spots along the lateral line. The head



Drawn from Jordan & Evermann

is somewhat flattened. This eel reaches a length of about two feet. It is known from the Society Islands and the Hawaiian Islands.

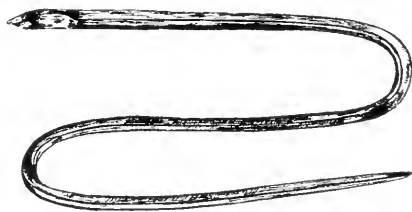
It was named for Henry W. Henshaw, the famous naturalist who lived at Hilo, Hawaii.

Snake Eel

33-7 *Caecula flavicauda* (Snyder)

The body of this eel is very long and slender, and is tipped with a very long, slender, sharp snout. The body is uniformly pale brown in color. It reaches a length of nearly fifteen inches.

This eel is known only from Hawaii. It was taken in a dredge between Maui and Lanai in from 21 to 66 fathoms.



Drawn from Jordan & Evermann

THE WHIP EEL FAMILY

34 *Family Ratabouridae (Moringuidae)*

The whip eels are a small family of slender, almost worm-like creatures. They have several unusual features about them. They have many vertebrae and the fins are poorly developed. The heart is placed far behind the gills and the tail is very short. The family seems to be most common in the East Indies.

Only one member of this family is known from the Hawaiian Islands.

Java Whip Eel

34-1 *Rataboura javanicus* (Kaup)

This white eel is reported as a dull sepia color above and a pale isabella color beneath. It reaches a length of about fifteen inches. It is found from the East Indies to Japan, in the Tuamotus, and in the Hawaiian Islands.



Drawn from Jordan & Evermann

THE MORAY EEL OR PAINTED EEL FAMILY

35 *Family Echidnidae*

The moray eels are easily distinguished from all other eels by the small round gill openings and by the absence of the pectoral and pelvic

fins. They all have a thick, leathery skin which is variously colored. Some of the species are uniform in color, while others are mottled or speckled. They are reported to reach a length of ten feet. The jaws are equipped with strong muscles which form a hump on the top of the head and the mouth contains many, strong, sharp teeth.

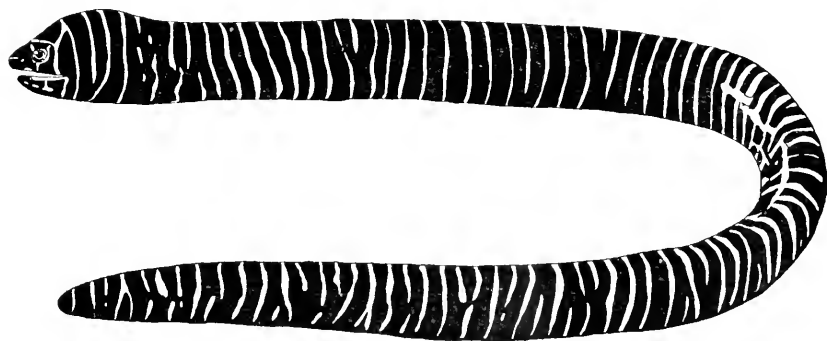
The moray eels are all coastal fishes and live about the coral reefs. They spend most of their time partially hidden in holes in the rocks with only their heads showing. They are a vicious and pugnacious lot and reach out or come out to capture anything which appears to be food.

The flesh is edible and appears on the markets.

The group is a large one and contains more than 120 species most of which are American. Of this family more than eighteen species are known from Hawaiian waters.

Zebra Moray

35-1 *Echidna zebra* (Shaw)



Drawn from Jordan & Evermann

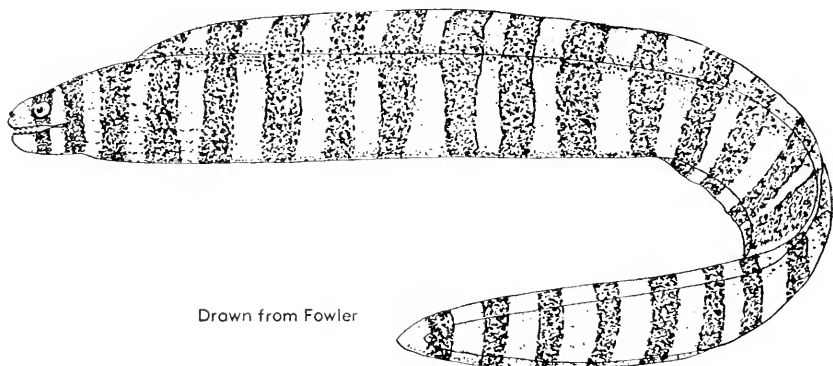
The body of this eel is reddish brown in color and is marked with from fifty-five to eighty-three vertical white rings. These rings encircle the body and may be either clear or indistinct. This eel will reach a length of forty-five inches. It is found from East Africa to the East Indies, in the Philippines, the Society Islands, and in the Hawaiian Islands.

Puhi Leihala

35-2 *Echidna polyzona* (Richardson)

The body of this eel is usually marked by twenty-five to twenty-nine broad, reddish bands encircling the body, although in some specimens the bands may not be visible. The body is compressed laterally and the

head is slightly larger than the body. This eel reaches a length of at least fifteen inches. It lives among the coral rocks and is fairly common in the Hawaiian Islands.

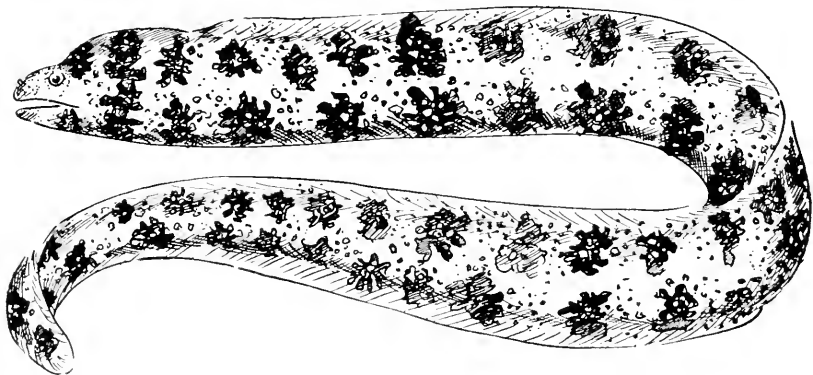


Drawn from Fowler

This eel is found from the Red Sea to the East Indies, to Tahiti, about Riu Kiu, and in the Hawaiian Islands.

Puhi Kapa

35-3 *Echidna nebulosa* (Ahl)



Drawn from Jordan & Evermann

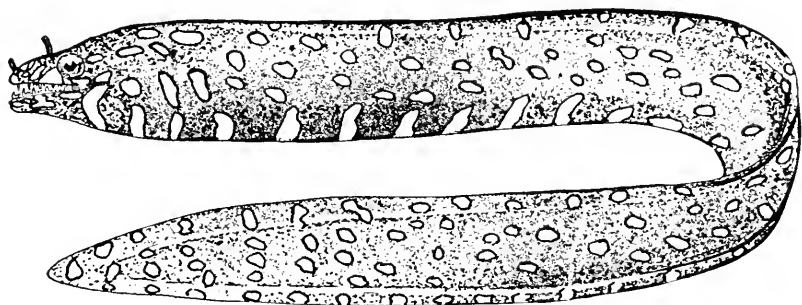
The body of this eel is whitish in color and is marked with multi-colored spots and a network of gray lines. The body, which is compressed laterally, will reach a length of at least thirty inches.

Jordan and Evermann state that this eel has the reputation of making havoc among all kinds of fishes. The Hawaiians compared Kamehameha with this eel and named him "puhi kapa" because he was victorious over all.

This eel is widely distributed. It is found from East Africa to the East Indies, along Australia and China, to Tahiti, and the Hawaiian Islands.

Puhi Oa, Puhi Kauila, or Puhi Wela

35-4 *Muraenophis pardalis* (Schlegel)



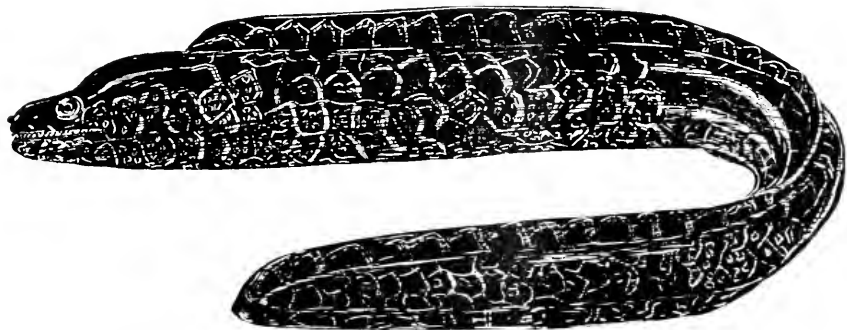
Drawn from Jordan & Evermann

This eel is dark brown in life with yellow and black spots and will reach a length of at least twenty inches. It is reported that one specimen of this eel in captivity in the Waikiki marine laboratory, although savage when first caught, grew tame enough after two years to submit to having its neck rubbed, although it would not allow itself to be removed from the tank.

This eel is known from Japan, Tahiti, Laysan, and the larger Hawaiian Islands.

Puhi Kapa, Puhi Papaa, or Puhi Wela

35-5 *Lycodontis picta* (Ahl)



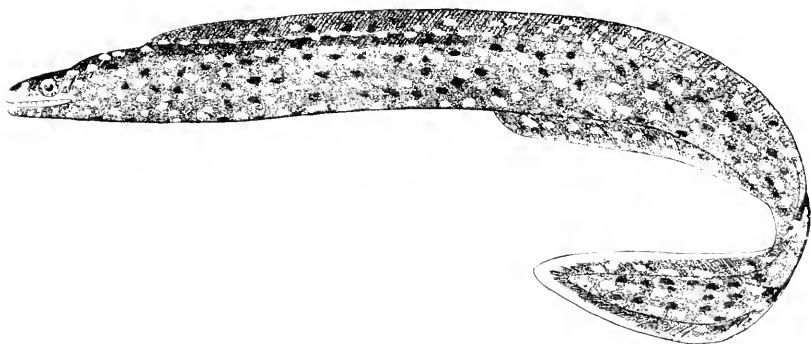
Drawn from Jordan & Evermann

This eel is light olive in color and is dusted with black to form marblings over the body. The belly of the animal is paler in color. This color scheme is subject to variation. The species reaches a length of about five feet.

This eel is known over a wide range. It occurs from the eastern coast of Africa eastward through the Indian Ocean, the East Indies, Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands.

Moray Eel

35-6 *Lycodontis meleagris* (Shaw & Nodder)



Drawn from Jordan & Evermann

This moray eel is olive brown in color, is mottled with darker brown, and covered with punctated spots of yellowish and yellowish-white. The tip of the tail is whitish in color. It reaches a length of at least four feet.

Although this eel has a wide range, it is not particularly common about the Hawaiian Islands. It is found from East Africa eastward through the East Indies, Japan, Melanesia, and Polynesia as far as Hawaii and its leeward island chain.

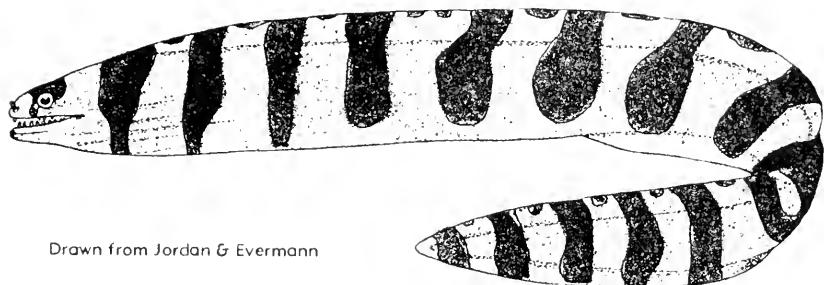
Moray Eel

35-7 *Lycodontis tile* (Buchanan-Hamilton)

This moray eel is uniform mauve brown in color and is covered with variable whitish dots, bars, and blotches. It reaches a length of over forty inches.

This eel is known from the estuaries of the Ganges river. It is uncommon in Oceania and Hawaii. Only one specimen is known from each of these areas.

Puhi Ou

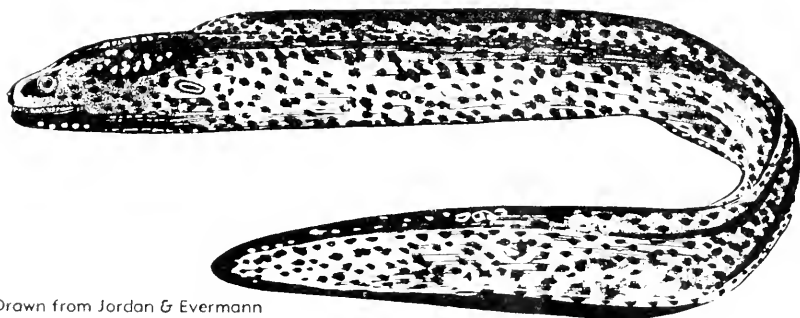
35-8 *Lycodontis petelli* (Bleeker)

Drawn from Jordan & Evermann

In color this eel is a dull reddish brown. It is marked by seventeen to twenty-two vertical, saddle-shaped cross bars. These color bands may vary. This eel will reach a length of three feet.

This eel is widely distributed. It is found from the Red Sea eastward through the Indian Ocean, the East Indies, Micronesia, Melanesia, and Polynesia as far as the Line Islands and Hawaii. It is reported to be common in Samoa.

Moray Eel

35-9 *Lycodontis flavomarginata* (Ruppell)

Drawn from Jordan & Evermann

This eel has a color pattern which is mottled with yellowish and dark brownish spots. It measures a little over four feet in length.

This eel is found from the eastern coast of Africa through the Indian Ocean, the East Indies, Formosa, Melanesia, and Polynesia as far north as the Hawaiian Islands.

Moray Eel

35-10 *Lycodontis kidako* (Schlegel)

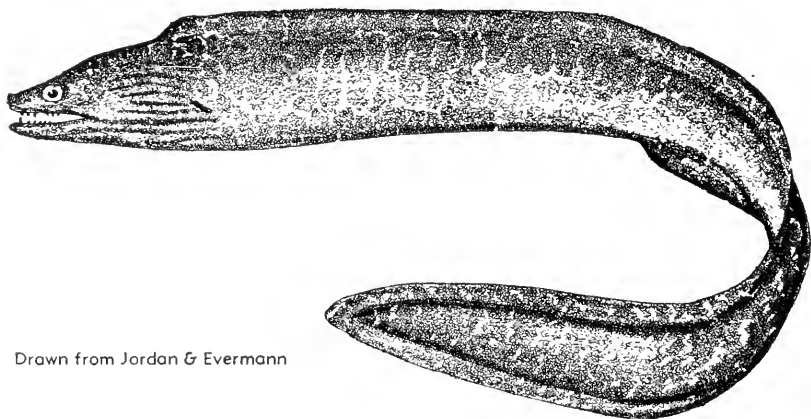


Drawn from Jordan & Evermann

This eel measures about three feet in length. It is speckled with brown spots on a background of pale brown or whitish color. It is found in Japan and in the Hawaiian and Leeward Islands.

Puhi Laumili or Puhi Laumilo

35-11 *Lycodontis undulata* (Lacepede)



Drawn from Jordan & Evermann

This eel is brownish in color and is speckled with white to form irregular lines which mark off irregular hexagonal areas on the body. It will range in length from one to three feet.

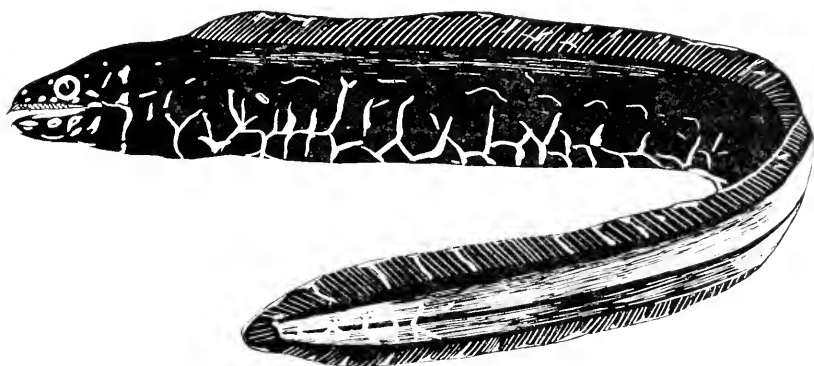
This eel is one of the most savage and voracious of eels. It feeds on fishes which it swallows whole or in a partly macerated condition. It is found from the surface to depths of almost 500 fathoms. It is one of the most common eels in the waters about the Hawaiian Islands.

This moray is found from the east coast of Africa through the East

Indies, along the coast of China and Riu Kiu, through Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands.

Richardson's Moray Eel

35-12 *Lycodontis richardsonii* (Bleeker)



Drawn from Jordan & Evermann

This moray eel is brownish in color above and below. The under side of the body is paler in color with reticulate whitish lines forming hexagonal areas on the lower surface.

It is found from Zanzibar eastward to the East Indies, the Society Islands, and northward to the Hawaiian Islands.

Moray Eel

35-13 *Lycodontis hepatica* (Ruppell)

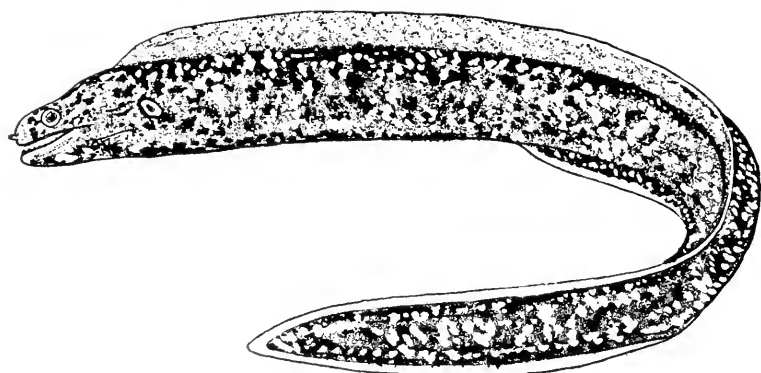
This moray eel is of a uniform, dull purplish-brown color above and lighter beneath. It is conspicuously marked by a narrow, white edge along the entire margin of the fin.

This eel is known from the Red Sea, the Hawaiian Islands, and probably elsewhere in the Pacific Ocean. It appears to be a rare species for only two specimens have been recorded from Hawaiian waters.

Moray Eel

35-14 *Lycodontis nudivomer* (Günther)

The ground color of this fish is brown over its entire body but it is covered with white spots which are small and closely set. This eel will reach a length of forty inches, although most individuals are smaller in size.



Drawn from Jordan & Evermann

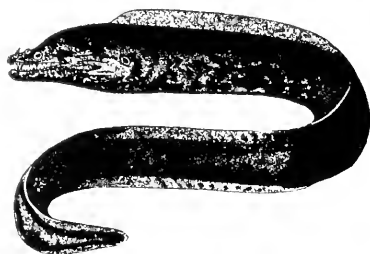
This species is known from Zanzibar on the east coast of Africa and from the Hawaiian Islands.

Painted Eel

35-15 *Enchelyornassa canina* (Quoy & Gaimard)

This eel is of a nearly uniform deep purplish-brown color. It will reach a length of five feet, although most individuals are nearer thirty inches in length.

This eel is found throughout the East Indies, through Samoa and the Society Islands, and extends as far northward as the Hawaiian Islands.



Drawn from Jordan & Evermann

Tiger Moray Eel

35-16 *Uropterygius tigrinus* (Lesson)



Drawn from Jordan & Evermann

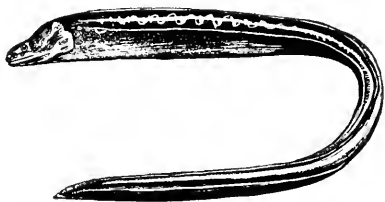
The body of this eel is round or cylindrical in shape and is not compressed. The skin is tough and thick and there are no fins on the body. This fish has been described as pale reddish-brown in color and is marked with black blotches which are edged with a paler brown than the general body background.

This eel is known from Samoa, the Society Islands, the Line Islands, and the Hawaiian Islands.

Moray Eel

35-17 *Uropterygius concolor* Ruppell

This eel is a small creature and measures from four to six inches in length. It is of a uniform brown color above and whitish beneath. It is very finely spotted with white on the sides. One specimen measuring 4.3 inches was caught in about 28 fathoms off the coast of Maui.



Drawn from Jordan & Evermann

This eel is known from the Red Sea and East Africa to the East Indies, Society Islands, Line Islands, Hawaiian Islands and Guam.

Marbled Eel

35-18 *Uropterygius marmoratus* (Lacepede)



Drawn from Jordan & Evermann

The marbled eel is of a deep, dusky blackish-brown color above and paler below. The darker areas are arranged in marbled fashion over the lighter ground color. This eel measures about twenty inches in length and has been taken in water from 21 to 46 fathoms.

The marbled eel is known from Zanzibar off the eastern coast of Africa to the East Indies, as far as the Tuamotus, the Line Islands, the Hawaiian Islands, and Guam.

THE CARP FAMILY

Including the Carp, Dace, Minnows, and Chubs

36 Family *Cyprinidae*

The carp family is by far the largest family of fresh water fishes. The species are not only numerous, but they are abundant and form a very difficult group for fish experts. There are more than 200 genera known and well over 1,000 species in the family of which about 225 are known from the United States. This family is particularly numerous in the fresh waters of the Old World and North America. It is estimated by some that there are as many as 2,000 species in this family between the Tropic of Cancer and the Arctic Circle.

The carp are fishes of moderate or small size. The barbels on their heads are either small or absent and the mouth is toothless. They are nearly all small, feeble fishes which form food for other carnivorous river fishes. One species, however, called the White Salmon of the Colorado River reaches a length of five feet and a weight of eighty pounds.

In order to keep their group alive carp release immense quantities of spawn. During the breeding season the members of the family get small tubercles on their heads and often bright pigment spots on the bodies.

Carp eat all manner of food including the eggs of predatory fishes thus reducing their numbers. They are little valued as food, the flesh being coarse, tasteless, and bony.

The family includes the carp, dace, chubs, roaches, bleaks, minnows, breams and shiners.

Of this immense family only two introduced species are known from the Hawaiian Islands.

Carp or German Carp

36-1 *Cyprinus carpio*

This carp was native to the rivers of China and was domesticated and reared by the Chinese centuries ago. It was introduced into Europe about 1700 and now inhabits most European streams. It was reared in ponds by the Germans and became known in the area as the German carp. It

was introduced onto Maui and Kauai in the Hawaiian Islands some time prior to 1900 and today is found throughout the Islands.

The carp is a hardy fish and grows rapidly under favorable conditions. They have an immense fecundity and will lay as many as 700,000 eggs. Although they will sometimes reach a weight of thirty or forty pounds, they are not a desirable food fish. They are caught, sold, and eaten by the Chinese and Japanese.

The carp has many enemies which devour its eggs and young. These include catfishes, sunfishes, snakes, turtles, kingfishes, and crayfishes.

Gold Fish

36-2 *Carassius auratus* (Linnaeus)

The gold fish is really olivaceous or greenish in color in its wild state. Its orange or variegated color is in reality retained only by selection. The fins and form of the fish vary widely and include many monstrosities. The body is stout and covered with large scales. It will reach a length of 12 inches.

The gold fish was originally native to the streams of Japan and China. It was taken to Europe about 1611 and was introduced into the United States at a fairly early date. Jordan reports that it was being sent to San Francisco to be sold alive in the markets in 1867. It appeared in the Hawaiian Islands sometime prior to 1900. It is found today in the middle and lower valleys in the streams, taro patches, ditches, and reservoirs.

THE LOACH FAMILY

37 *Family Cobitidae*

Although the family of the loach fishes resembles catfishes, they are really more closely related to the minnows. They have long barbels about the mouth and are rather eel-like in shape. They are all small fishes of less than one foot in length, but of hardy constitutions.

The loaches are bottom living fishes often burying themselves in the mud of the river bottoms. They feed on insects and worms and other water creatures.

The family seems to have been native to the ponds and streams of Europe and Asia.

Only one introduced species of this entire family is known from Hawaiian waters.

Dojo or Weather-fish

37-1 *Misgurnus anguillicaudatus* (Cantor)

The body of this loach is brownish in color and is covered with darker brownish spots, including a black spot at the base of the tail. The fish will reach a length of ten inches, although most of them seldom exceed five inches in length.

The dojo is an inhabitant of the weeds and mud of fresh water ponds and streams. It is found commonly in the streams about Honolulu and probably elsewhere in the Islands.

The dojo is native to the lowlands of China, Korea, Japan, and Formosa and was probably introduced into the Hawaiian Islands from this area.

THE SEA CAT-FISH FAMILY

38 *Family Tachysuridae (Ariidae)*

The sea catfishes are sleek, silvery fishes which are covered with a smooth skin. They reach a fair size and are often seen in sandy bottoms.

The sea cats are not valued as food because their flesh is reported to be tough and coarsely flavored. It is also reported that pelicans and other sea birds which devour these fish are often killed by the sudden erection of the pectoral spines.

The males exhibit a curious habit. They receive the eggs which are about as large as a pea into their mouth and there carry them until they hatch.

They are most common in the tropical seas but are found in neither Europe nor Japan.

Only one member of this family is known from Hawaiian waters.

Sea Cat-fish

38-1 *Tachysurus dasycephalus* (Gunther)

There is some doubt in the minds of fish experts whether the single specimen reported from the Hawaiian Islands actually came from this area. Since no other members of the family occur here, Gunther's record is probably from an American specimen.

THE HORNED POUT OR CHANNEL CAT FAMILY

39 *Family Ameiuridae*

This family of cat fishes is a large group which lives in the rivers and warm waters of North America, South America, and Africa. They are

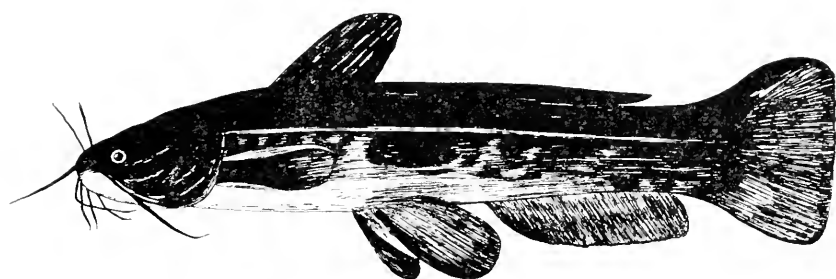
lazy fishes in their habits and seem to prefer to live in quiet water. Most of the species live in fresh water, although a few are marine in the tropics.

None of these fishes are native to the Hawaiian Islands. One species has been introduced into the Hawaiian Islands from the United States.

Common Bull-head Catfish

Also known as the Horned Pout, Schuylkill Cat, or Small Catfish

39-1 *Ameiurus nebulosus* (LeSueur)



The common catfish is yellowish-brown to black in color and is often clouded with darker areas. It will reach a length of twelve to eighteen inches.

The catfish feeds at night and spends most of the day resting. It builds nests in sheltered spots under logs, rocks, or stumps and makes excavations to enlarge them. It spawns in the spring of the year and guards both its nest and its young.

It is a hardy fish out of water and is edible.

This fish is widely distributed in the lakes, ponds, streams, and ditches over the entire United States. Originally native to the eastern half of the United States, it was found in the area from Maine to North Dakota and from Florida to Texas. It was introduced into the rivers of the Pacific coast including the Sacramento, San Joaquin, Gila, Humbolt, and into the state of Oregon. It is now found quite generally throughout the United States.

The catfishes in the Hawaiian Islands seem to have first been introduced into the Hawaiian Islands about 1890 by Mr. Charles Arnold of Hilo. They were brought from California and liberated near Hilo. They are found today on both Hawaii and Oahu and probably elsewhere.

THE CHINESE CATFISH FAMILY

40 Family *Clariidae* (*Chlariidae*)

The fishes in this family are all eel-like fishes with soft skeletons. The family is abundant in India where it inhabits the swamps and muddy streams. Some species of this family will reach a length of six feet.

A single member of this Asiatic family has been introduced into the Hawaiian Islands.

Chinese Catfish or Oopu Kui

40-1 *Clarias fuscus* (Lacepede)

This fish is somewhat eel-shaped in general design. The body of this fish is of a blackish-brown color above and fades to a dirty white color beneath. The sides of the body are marked with dots arranged into eight to thirteen vertical rows. It reaches a length of at least five inches. It has eight barbels about the mouth, the skin is smooth and without scales, and the eyes are small.

This fish is a fresh water species which was originally native to the lowlands of Southern China. It was introduced into the Hawaiian Islands by the Chinese sometime prior to 1901. It lives in our lowlands under rocks in slow moving water, in taro patches, irrigation ditches, and in muddy streams. It is also reported from Guam.

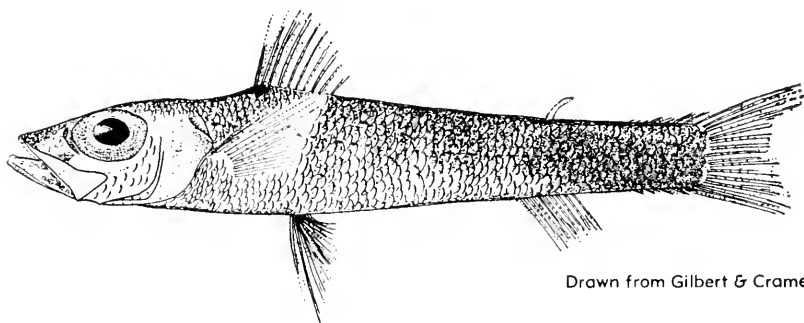
THE AULOPID FISH FAMILY

41 Family *Aulopidae*

This family of fishes is a small fairly primitive group. They have rough scales on their bodies, an adipose fins, and no luminous spots. Only one species is known from the Hawaiian Islands.

Aulopid Fish

41-1 *Chlorophthalmus prouridens* Gilbert & Cramer



Drawn from Gilbert & Cramer

This rare fish is known from six specimens taken in the Hawaiian Islands at depths ranging from 298 to 351 fathoms. These specimens measured from three and one-half to seven inches in length.

THE LIZARD FISH FAMILY

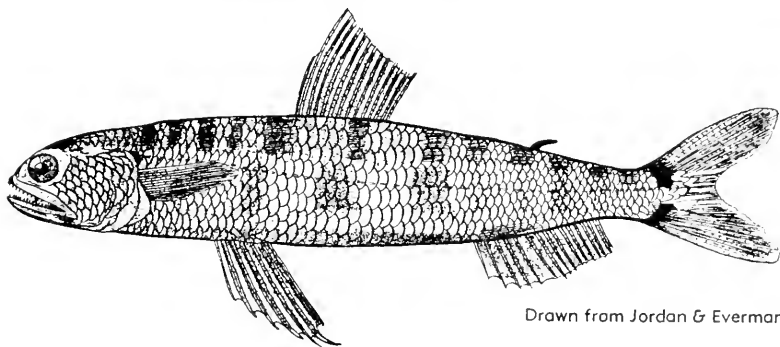
42 Family Synodontidae

The lizard fishes are a family of small, slender, cylindrical fishes with a scaly head, soft rays, and a small adipose fin. Some of the members of the family have phosphorescent spots or photophores on the sides of their bodies. The family gets its common name of lizard fishes from the fact that the members of the family have large mouths and lizard-like heads. The members of the family usually live on sandy bottoms near shore, although a few members are bathypelagic and live in deep water. A few species in the family are widely distributed.

Of more than forty known species, five have been recorded from the Hawaiian Islands.

Kawelea' or Welea

42-1 *Trachinocephalus myops* (Schneider)



Drawn from Jordan & Evermann

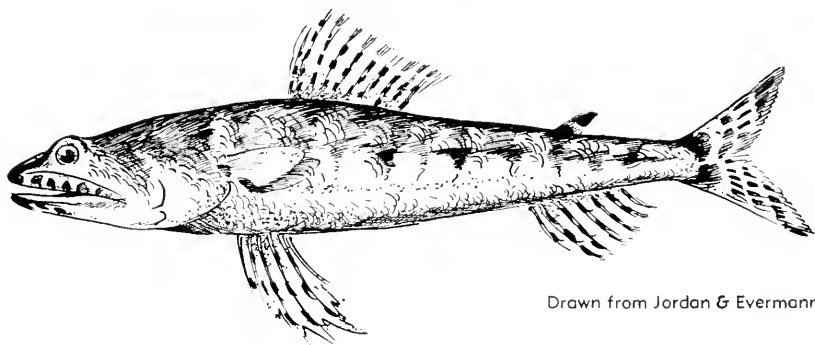
This lizard fish is of a grayish or brownish color above and paler in color below with silvery reflections. The sides of the body are marked with yellow or brownish stripes, the upper portions of which are somewhat wavy. The top of the head is described as vermiculate, the opercle contains a black blotch at its upper angle, and a dark band extends from the eye across the lower jaw. The body seems to be marked with about twelve irregular cross bars of a dirty yellow color. The fish measures about nine inches in length.

This fish is a surface water fish and is widely distributed in tropical waters. It is found throughout Oceania and the tropical waters of the globe. It occurs from Massachusetts to Florida, off Cuba, Japan, the Philippine Islands, and the Hawaiian Islands.

Ulae

42-2 *Synodus japonicus* (Houttuyn)

Plate III, Figure 6



Drawn from Jordan & Evermann

The ground color of the ulae varies from white through flesh and rose colors to a reddish brown. The upper side of the body is covered with color ranging from reddish brown to a brick red. The lower surface of the body is white. There seems to be two color forms of this fish according to ichthyologists. One is orange-green or greenish and the other is orange-brown or reddish. Both of these color forms are found in Japan and in the Hawaiian Islands. It will reach a length of fourteen inches, although most of them are much shorter.

This fish is found from the Red Sea and Zanzibar to the East Indies, Japan, Tahiti, and the Hawaiian Islands. It has been taken at Pearl and Hermes Reef.

Lizard Fish

42-3 *Synodus kaianus* (Gunther)

This lizard fish is marked with alternating wide and narrow cross bars. The lower side of the body is a bright silvery color. It reaches a length of at least six inches.

This fish is known from the East Indies to the Hawaiian Islands. The Hawaiian specimens were taken in Pailolo Channel off the coast of Maui between 122 and 142 fathoms.

Ulae

42-4 *Saurida gracilis* (Quoy & Gaimard)

This lizard fish is brownish in color above and is marked with six or more deep brown saddles on the back with blotches between. The lower surface of the fish is of a dull silvery color. It will reach a length of twelve inches.

It is a surface water fish and is common on sandy shores at moderate depths. Specimens have been taken off the coast of Maui between fourteen and eighteen fathoms.

This fish is found from East Africa and Mauretius, to the East Indies, Tahiti, and Hawaii.

THE BATHYPTEROID FISH FAMILY

43 *Family Paralepididae* (*Sudidae*)

The members of this family resemble the barracuda in general appearance. They have very large mouths and a projecting lower jaw. They are voracious fishes and live in the open sea or in deep water.

Only one specimen of this family is known from the Hawaiian Islands.

Paralepid Fish

43-1 *Lestidium nudum* Gilbert

Drawn from Gilbert

This rare fish is known from only one specimen taken between 283 and 284 fathoms in Pailolo Channel off the Island of Maui. It measured about eight inches in length and was of a translucent color with a faint silvery lustre. The back was a little darker in color than the rest of the body and there was a blackish area beside the tail.

THE BATHYPTEROID FAMILY

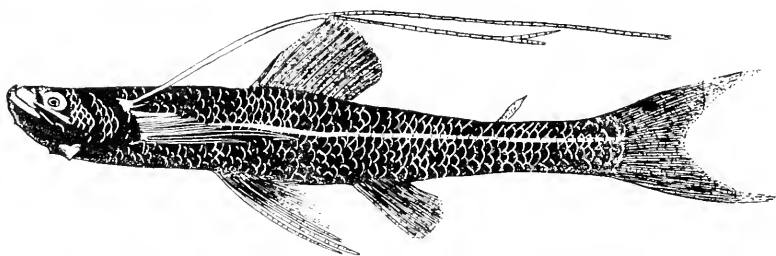
44 *Family Bathypteroidae*

This family of fishes includes only two known members. Two specimens were taken in Hawaiian waters and the other member was the type around which the family was defined.

The fishes in this family are deep sea fishes with eyes which are small and almost useless.

Bathypteroid Fish

44-1 *Bathypterois longifilis* Gunther



Drawn from Gilbert

The Hawaiian member of this fish family measured about eight inches in length and was of a brownish-black color. The fish was decorated with white pectoral filaments which arise from the upper side of the body and extend along the body to the tail. These filaments branch into two half-way along the length of the body.

One specimen was taken off Bird Island (Nihoa) between 313 and 800 fathoms; the other was taken off Kauai between 1,000 and 1,300 fathoms.

THE LANTERN FISH FAMILY

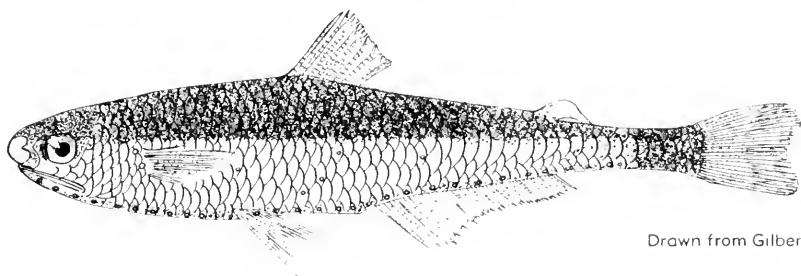
45 Family *Myctophidae* (*Scopelidae*)

The lantern fishes are a large group of small, feeble fishes which are seldom seen. They live away from shorelines, often at considerable depths, and are widely distributed in the open sea. Their bodies are long and slender and are covered with luminous spots.

These fishes come to the surface of the water at night or in stormy weather when the sun is not bright and are often thrown upon the decks of ships. During the day time they descend to deeper water. They are a group of pelagic and deep sea fishes which are seldom encountered by fishermen.

Of about 1,000 species, a dozen are known from California and eighteen have been recorded from the Hawaiian Islands.

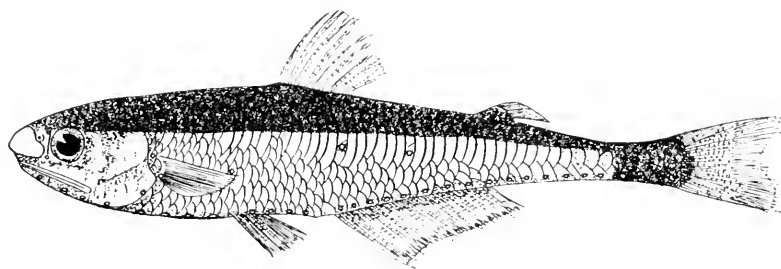
Lantern Fish

45-1 *Myctophum nigro-ocellatum* (Gunther)

Drawn from Gilbert

This lantern fish is dark in color on the back of the body and silvery on the lower side. It reaches a length of about one inch. This is a pelagic species and is widely distributed. It is found about the Hawaiian Islands and between Hawaii and San Francisco.

Lantern Fish

45-2 *Myctophum andrae* (Lutken)

Drawn from Gilbert

This lantern fish is dark above and silvery below. It reaches a length of about two inches. It is a pelagic species and was recorded from Niihau, Oahu and Hawaii's leeward island chain.

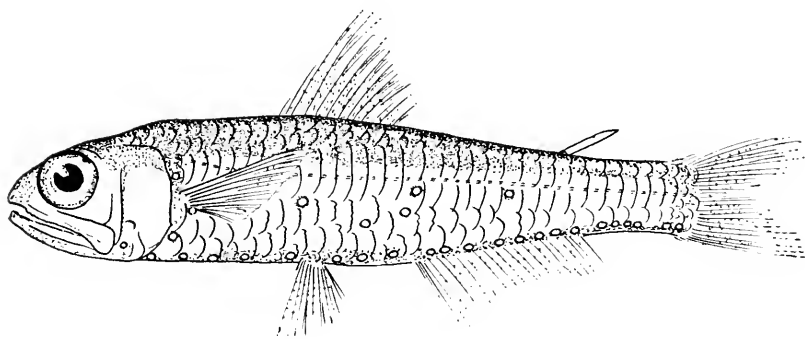
Lantern Fish

45-3 *Myctophum spinosus* (Steindachner)

In color, this lantern fish is violet above and shining silvery on its sides and lower surface. It measures about five inches in length. It is a pelagic species and is found in the East Atlantic, Indian, and western Pacific Oceans including Wake Island and the Hawaiian Islands.

Lantern Fish

45-4 *Myctophum asper* (Richardson)



Drawn from Gilbert

This lantern fish is one of the most abundant of the group. It is pelagic and lives at the surface of the water. It is widely distributed in the Atlantic, Indian, and Pacific Oceans.

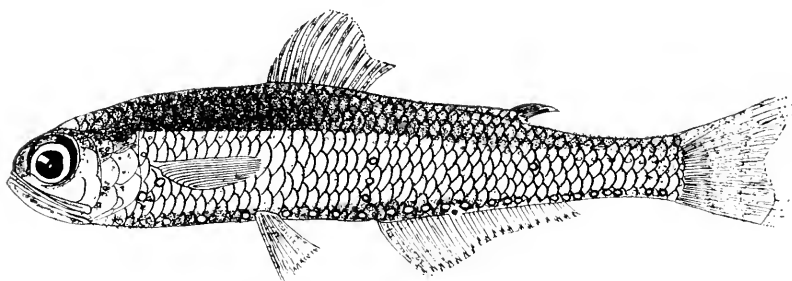
Lantern Fish

45-5 *Myctophum aurolaternatum* Garman

Only one specimen of this fish is known from near the Hawaiian Islands.

Lantern Fish

45-6 *Myctophum affine* (Lutkin)



Drawn from Gilbert

This lantern fish has a slender, compressed body and measures about four inches in length. It is a pale grayish brown or dusky brown color above. The sides and belly are silvery in color and are speckled with

brown. This fish is a pelagic species and is known from both the Atlantic and the Pacific Oceans. In the Pacific Ocean it is known from Hawaii and its leeward island chain.

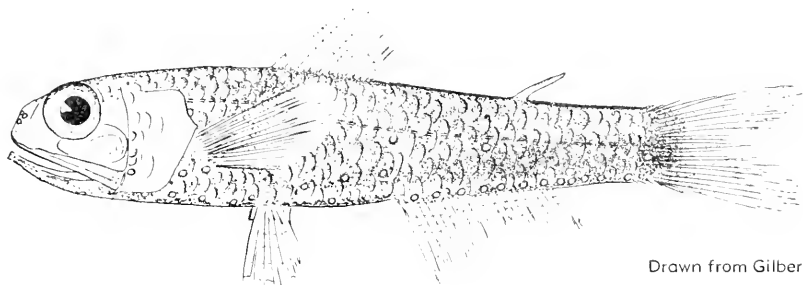
Lantern Fish

45-7 *Myctophum punctatum* Rafinesque

This lantern fish is known from the Mediterranean Sea, the Atlantic, Indian, and Pacific Oceans. It is widely distributed.

Lantern Fish

45-8 *Myctophum pterotum* (Alcock)

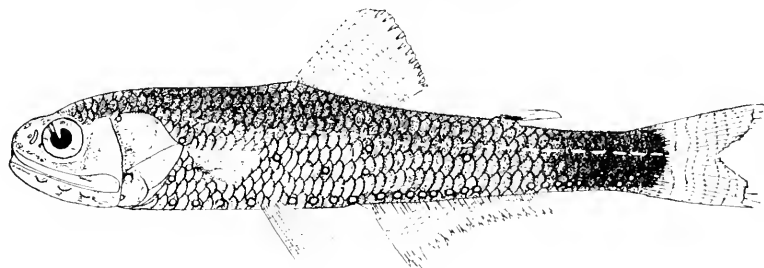


Drawn from Gilbert

This lantern fish is known from the Indian, Pacific, and South Atlantic Oceans. It has been taken in the Hawaiian Islands just south of Oahu in 310 fathoms.

Evermann's Lantern Fish

45-9 *Myctophum evermanni* Gilbert

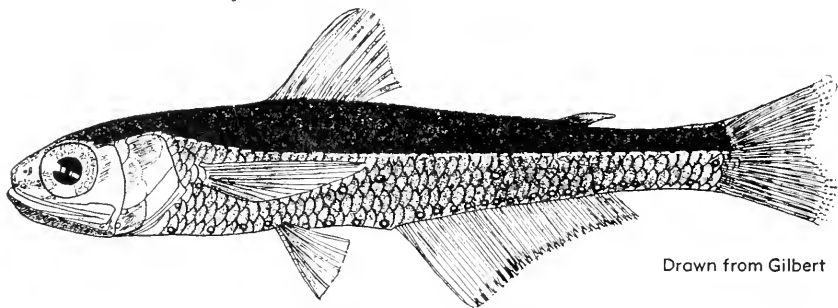


Drawn from Gilbert

This lantern fish measures about one inch in length. It is of a generally blackish color. The sides of the head are whitish in color.

The fish is a pelagic surface fish and is known from the Marquesas and the Hawaiian Islands. It was named for Dr. Barton Warren Evermann, ichthyologist with the United States Fish Commission.

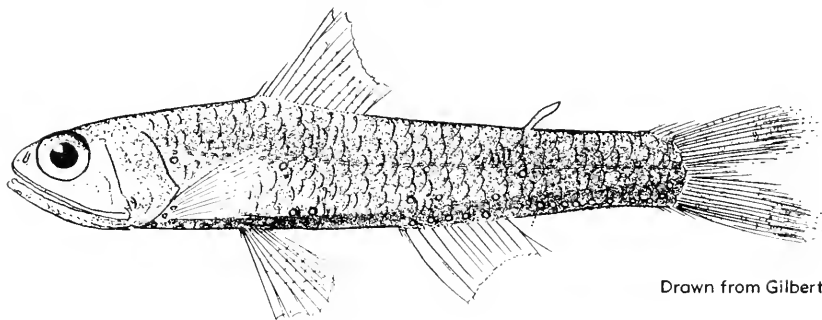
Reinhardt's Lantern Fish
45-10 *Myctophum reinhardtii* (Lutken)



Drawn from Gilbert

This lantern fish is slender in shape and has large eyes. It is dark in color with bluish reflections and measures about two inches in length. It is a pelagic species found in the Hawaiian Islands.

Lantern Fish
45-11 *Diaphus dumerili* (Bleeker)

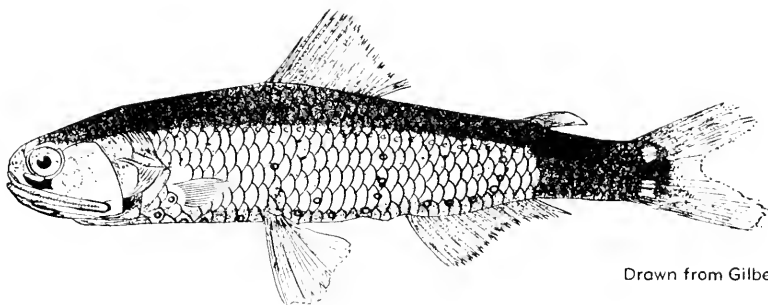


Drawn from Gilbert

This lantern fish is a bathypelagic and pelagic species in the tropical Atlantic, Indian, and Pacific Oceans. The only Hawaiian specimen known is in the United States National Museum.

Lantern Fish
45-12 *Diaphus adenomus* Gilbert

This lantern fish, measuring about six inches in length, is of a dusky color above and lighter beneath. The fins are blackish in color. This fish

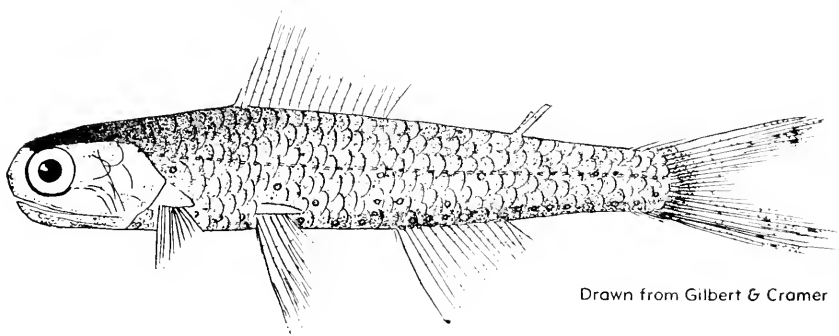


Drawn from Gilbert

was taken in the Hawaiian Islands in depths ranging from 265 to 362 fathoms. It is also thought to occasionally be pelagic in its habits.

Lantern Fish

45-13 *Diaphus crysorrhynchus* Gilbert & Cramer



Drawn from Gilbert & Cramer

This lantern fish is known only from the Hawaiian Islands. It has been taken from the surface down as far as 282 fathoms.

Townsend's Lantern Fish

45-14 *Lampanyctus townsendi* Eigenmann & Eigenmann

This fish is known to occur on both sides of the Hawaiian Islands, in Japan, the Marquesas, and off the coast of California, but it has never been recorded from the Hawaiian Islands.

The Black Lantern Fish

45-15 *Lampanyctus niger* (Günther)

The body of this lantern fish is uniformly blackish in color including the bases of the fins. It is distributed from the East Indies to Japan and

to the Hawaiian Islands. This species is a deep water fish and has been taken in the Hawaiian Islands in depths ranging from 411 to 460 fathoms.

Lantern Fish

45-16 *Lampanyctus omostigma* Gilbert

This lantern fish is known from only one specimen caught in the Kau District on the Island of Hawaii. It was dusky to blackish in color with brownish shades. The fins were of a pale to whitish color. The fish measured about four inches in length and was thought to be a pelagic species.

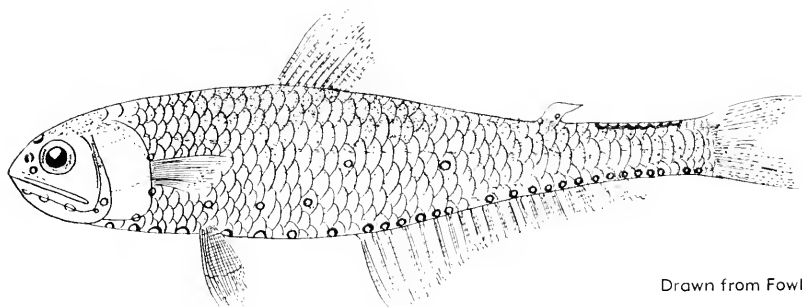
Lantern Fish

45-17 *Neoscopelus macrolepidotus* Johnson

This lantern fish will reach a length of ten inches. It is reported from the Atlantic Ocean, Japan, and the Hawaiian Islands. Although the Hawaiian specimens were taken between 222 and 800 fathoms, it has been reported by scientists as pelagic and widely distributed.

Cocco's Lantern Fish

45-18 *Rhinoscopelus coco* (Cocco)



Drawn from Fowler

This lantern fish reaches a length of about three inches. It may be recognized by the fact that the base of the tail is very long and slender. It is widely distributed in tropical seas. The drawing of this species is from a young specimen.

THE ATELEOPID FISH FAMILY

46 Family *Ateleopidae* (*Ateleopodidae*)

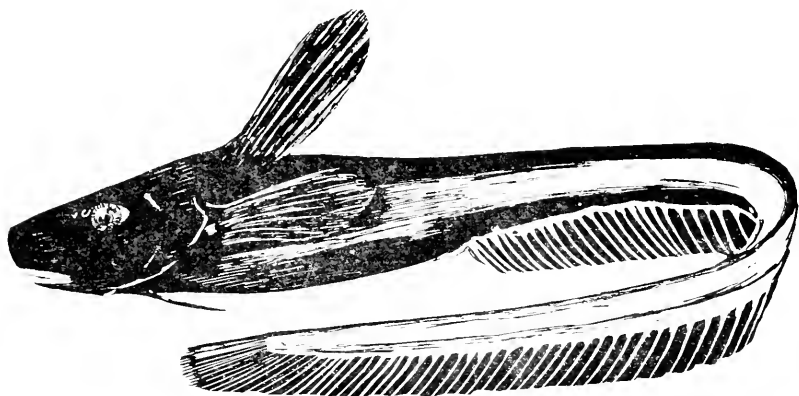
The fishes which make up this family are deep water species and

have a body which ends in a long, tapering tail. The anal fin extends along the last half of the body.

Only one representative of this family occurs in the Hawaiian Islands.

Ateleopid Fish

46-1 *Ateleopus plicatellus* Gilbert



Drawn from Gilbert

This fish is of a dusky, translucent color. The tips and the terminal ends of the ventral filaments are white, while the fins themselves are black. The ventral fins are present as a pair of short filaments.

Only two specimens of this fish are known from the Hawaiian Islands. They were taken between 257 and 684 fathoms.

THE KILLIFISH OR MINNOW FAMILY

47 Family Cyprinodontidae

The members of this family are in general small, although a few do reach a length of twelve inches. They have scaly heads and feed mostly on vegetation, although some do eat worms and insects. Some of the members of the family are oviparous and lay their eggs, while others hatch their eggs within the body.

The family is widely distributed in the North Temperate Zone. They are common in eastern North America from New England and California southward to Argentina. They also occur in Asia and Africa where they live in rice swamps, streams, and ditches. They occasionally enter the sea, but they stay close to shore.

In 1905 the Legislature of the Territory of Hawaii appropriated money to hire collectors to introduce mosquito fishes of this family into the Hawaiian Islands.

Only two members of this family have to date become established in the streams of the Territory of Hawaii.

Killifish

47-1 *Fundulus grandis*

This minnow is native to the waters of the Gulf of Mexico. It prefers brackish or somewhat salty water. It was introduced into the Hawaiian Islands as the result of a special legislative appropriation which was part of a campaign to control the mosquitoes.

Guppy, Rainbow Fish, or Millions

47-2 *Lebistes reticulatus* (Peters)

The guppy measures from one to three inches in length. The females are of a light yellow-olive color, while the males are variously spotted and striped. The males are more slender than the females and have the anal fin modified into an intromittent organ.

This fish was native to Barbados, Trinidad, and Venezuela and was introduced into the Hawaiian Islands between 1920 and 1922 by Charles Montague Cooke, Jr. It is now widely distributed in our streams from the upper valleys to the sea shores. They swim about in schools just beneath the surface and feed on mosquitoes and other food. They are reported to chase mosquitoes even when they are not hungry and to suck them into the mouth thereby killing them. They later eject them dead.

THE TOP MINNOW FAMILY

48 Family *Poeciliidae*

The members of this family are mostly all small fishes ranging in length from one to several inches. In general, they are brightly colored; the males are smaller than the females and are more gaily colored. The species are numerous and are difficult to determine.

Most of these fishes are viviparous in their habits and bring forth their young alive. They inhabit fresh water swamps, streams and ditches and a few even enter the sea.

The top minnows were originally confined to the warmer parts of America. They are very abundant from New England to California and

southward to Argentina. Representatives of the family are also found in Asia and Africa. The famous "four-eyed fish" belongs in this family.

None of the members of this family are native to the Hawaiian Islands. All of the species found here have been introduced, some of them through the support of a legislative appropriation made in 1905 to hire collectors to transport them from Galveston, Texas.

At least four species of this family are now found in Hawaiian waters.

Mosquito Fish or Top Minnow

48-1 *Gambusia affinis* (Baird & Girard)

The mosquito fish are small in size; the males measure $1\frac{1}{4}$ inches, while the females average about $2\frac{1}{2}$ inches. When full grown they may reach a length of 3 or even 4 inches. The males are smaller, more slender, and darker in color than the females. They are of a light olive color with an iridescent luster. The dorsal and caudal fins are marked with irregular rows of black dots.

The top minnows inhabit swamps, streams, creeks, taro patches, ditches, and the like. They prefer fresh water, although they are often found in brackish areas. They seldom enter salt water. Because of their small size, they are able to penetrate to the sources of streams and are consequently widely distributed.

The mosquito fishes are active, hardy fishes feeding in schools at the surface or in debris and plants along the banks. They are viviparous and give birth to their young alive. The young at birth are agile and strong and are able to escape dangers. They are a very useful and effective fish against mosquitoes because they are very strong and are able to adapt themselves to a variety of conditions.

The mosquito fish is native to the lowlands of the South Atlantic and Gulf States and from New Jersey and Illinois southward. They are also found in the rivers of Texas and Mexico.

This fish was introduced into the Hawaiian Islands by Alvin Seale to help in the control of mosquitoes.

Molly, Mollies, or Sailfin

48-2 *Mollienesia latipinna* Le Sueur

The mollies or sailfins measure about one-fourth inch at birth and reach a length of two to four inches. Both sexes are of a light olive-

green color and are marbled with darker spots and bands. The male has a long banner-like dorsal fin.

This little fish is native to the lowlands, streams, estuaries, and salt marshes from South Carolina to northern Mexico. The date of its introduction into the Hawaiian Islands is uncertain. It is reported by some that it was introduced by the Legislature in 1905, while others believe that it was introduced into Nuuanu Stream about 1916 by Alvin Seale.

In Hawaii, this fish inhabits both fresh and brakish water and may be found in lagoons, pools, ditches, and sometimes ventures into the sea where the water is not too salty. In fresh water it is a very effective control for mosquitoes.

Swordtail Minnow

48-3 *Xiphophorus helleri* Heckel

The swordtail minnow is easily identified by the fact that the males have the lower ray of the caudal fin prolonged into a sword-shaped appendage which is almost as long as the fish and which is golden yellow and edged with black. When born the fishes will measure about one-fourth of an inch and will grow to reach a length of one to four inches. The females are usually larger than the males.

The swordtail minnow was introduced into the Hawaiian Islands by Charles Montague Cooke, Jr., between 1920 and 1922. It is found today in island streams and ponds from the upper valleys to the canals and taro patches of the lowlands.

Moonfish or Platy

48-4 *Platypoecilus maculatus* Gunther

The moonfish measures from one to two inches in length and is variously colored due to artificial breeding. In its wild state in Mexico this fish is olivaceous in ground color and is marbled with small black spots.

The moonfish is a native of the lowland streams of the Atlantic side of Mexico. It was introduced into the Hawaiian Islands and liberated in Oahu streams by Charles Montague Cooke, Jr., in 1922.

The little fish inhabits ditches and ponds where it swims in small schools near the surface of the water. It is an effective agent against mosquitoes.

THE NEEDLE FISH FAMILY

Also known as the Hound Fishes, Gar Fishes, Salt Water Gars, Bill Fishes, and Long Tom Fishes

49 Family *Belonidae*

The needle fishes are usually of a greenish color on the back and pass through a bluish or purplish cast along the sides of the body to a white belly. They are often marked with a silvery stripe running along the side of the body. They are very long and slender fishes and will reach a length of five or six feet. The jaws of these fishes are very unusual. They are long and slender and form a beak of which the lower jaw is the longest. The lateral line of these fishes is present as a fold running low along the side of the body.

The needle fishes are widely distributed, although most of the species are from American waters. They live at the surface and are widely distributed in all of the warm seas of the world. During the warmer months of the year they usually move nearer the shorelines and sometimes enter rivers.

The needle fishes are a voracious and carnivorous group with habits and appearance much like the pike fishes and gar fishes, although they are related to neither. These fishes are reported to be easily excited and to jump out of the water as they swim along. They appear to attain a fair speed and sometimes crash into the sides of ships. It is reported that the larger individuals are a source of danger to swimmers and fishermen and have been known to pierce the bodies of individuals in the course of their wild leaps.

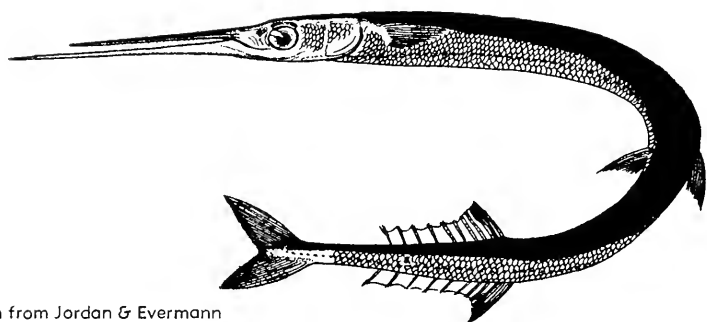
Most of the needle fishes are good eating. The flesh is snow white, firm, and of good taste. These fishes have often been avoided as food because the bones of some of the larger species are green in color.

Of about fifty known species, four have been reported from the Hawaiian Islands.

Flat-Tailed Needle Fish

49-1 *Belone platyura* Bennett

This needle fish is brownish, greenish-purple, or blue-black in color above and silvery white on the sides and lower surface. The body is elongated and the jaws are long and slender, the upper jaw being much shorter than the lower. This species will reach a length of forty inches, although most individuals are not that large.



Drawn from Jordan & Evermann

This needle fish is widely distributed in the Indo-Pacific area including Samoa and the Hawaiian Islands.

Aha-aha or Au-au

Also known as He aha-aha (small) and Ku welia (large)

49-2 *Strongylura indica* (Le Sueur)



Drawn from Jordan & Evermann

This needle fish is a bluish-green or brownish color above, while the sides and lower surface are of a paler greenish-cream color. The fish is a large species and will reach a length of five feet, although most individuals are only half of that length. The jaws of this fish are long, strong, and powerful and are set with large teeth. This fish may be recognized by a small lateral keel along the base of the tail.

This needle fish is found in the open sea and is a market fish of considerable importance.

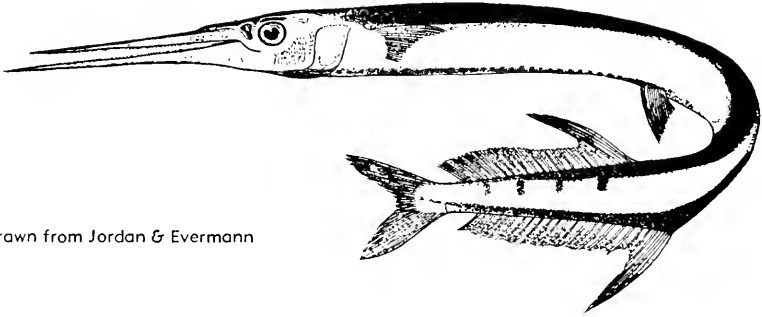
The aha-aha is widely distributed. It occurs from the eastern coast of Africa, through the Indian Ocean, the East Indies, Japan, and the islands of the Pacific Ocean including the Hawaiian Islands.

Needle Fish

49-3 *Strongylura appendiculata* (Klunginger)

This needle fish is known from the Red Sea through the East Indies as far as Hawaii. It is apparently an uncommon species. It will reach a length of over three feet.

Aha-aha or Au-au
49-4 *Ablennes bians* (Valenciennes)



Drawn from Jordan & Evermann

This needle fish is dark greenish in color above and is silvery white on the sides and lower surface. The body is flattened or compressed and band-like and will reach a maximum length of forty inches.

This fish is circumtropical in distribution. It is commonly sold in Hawaiian Island markets.

THE HALF-BEAKS OR HERBIVOROUS BALAOS FAMILY

50 Family *Hemiramphidae*

The half-beaks are named for the fact that they have a long lower jaw and a very short upper jaw. The bodies of these fishes are long, slender and compressed. The caudal fin is forked, the lower fork being longer than the upper. Curiously enough, the lower jaw is toothed only at its base where it is opposite the upper jaw. The species are all small and seldom exceed one foot in length.

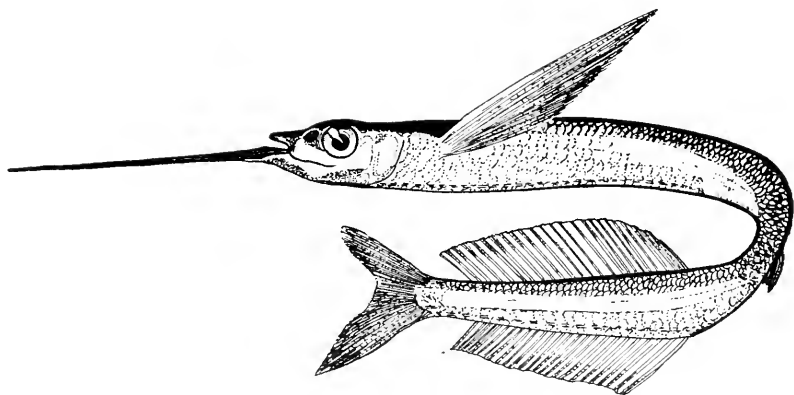
The half-beaks are semi-pelagic surface fishes. Many are shore dwelling species while some are truly pelagic. A few have the habit of leaping into the air. They are herbivorous fishes and live on green algae and small crustaceans. They are distributed in the warm seas of the world.

Of about 75 known species, six occur in the Hawaiian Islands.

Ihe-ihe

50-1 *Euleptorhamphus viridis* (Van Hassalt)

The body of this half-beak is of a pale bluish-silvery color above while the lower sides and belly are silvery. The beak is bluish-black



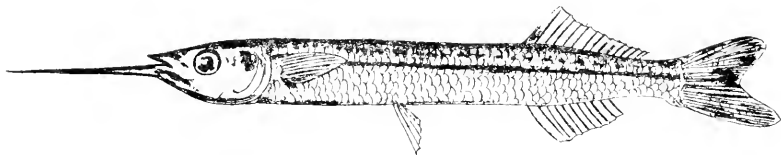
Drawn from Jordan & Evermann

and the scales on the back have dark edges. The body is long and ribbon-shaped and the jaw and pectoral fin are long. It will reach a length of about twenty inches.

This fish is thought to be a circumtropical species. It lives in the open seas and is common about the Hawaiian Islands.

Striped Half-Beak

50-2 *Hemiramphus unifasciatus* Ranzani

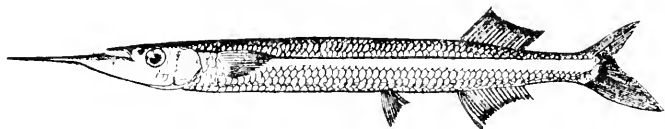


This half-beak is marked by a narrow, silvery, lateral stripe which is bordered above by a black line. The color is mostly silvery, but the body is marked at various places. The middle of the back contains three narrow black lines, the upper surface of the head and mandible are nearly black in color, while the mandible has a red tip. The dorsal and caudal fins are bordered with black. This species reaches a length of about fifteen inches.

Although this half-beak has never been reported from Hawaii, it has been taken on both sides of the Islands. It is possible that it does not frequent the coast of small islands. It is known from the east coast of Africa eastward to the Philippine Islands and on both shores of Central America.

Pacific Half-Beak

50-3 *Hemiramphus pacificus* Steindachner



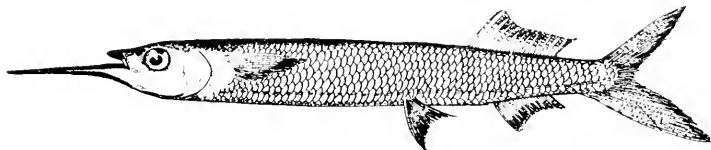
Drawn from Jordan & Evermann

The body of this half-beak is fairly long and compressed. It is reported as brownish above although this color may be more nearly greenish. The sides of the body are marked with two bands, one dark and one silvery, which extend the length of the body to the tail. The lower surface of the body is silvery. This species will reach a length of two feet, although most individuals are usually about eight or ten inches in length.

This half-beak is known from Samoa, Hawaii, and its leeward island chain.

Meemee or Iheihe

50-4 *Hemiramphus brasiliensis* (Linne)



Drawn from Jordan & Evermann

The body of this half-beak is moderately long and is of a dull bluish-black color above. The top of the head and the beak are blackish, while the sides and lower surface are silvery white in color. The median line of the back is marked with a faint streak which is bordered by a black line on either side. It will reach a length of fifteen inches.

This fish is widely distributed in the tropical waters of the Atlantic and Pacific Oceans.

Larval Half-Beak

50-5 *Hemiramphus praematurus* Schindler

This fish was described from a larval form taken near the Hawaiian Islands. The real identity of this fish is not known.

Larval Half-Beak

50-6 *Hemiramphus pietschmanni* Schindler

This larval form of a half-beak was described as new species. Its identity is not known.

THE FLYING FISH FAMILY

51 Family *Exocoetidae*

The family of the flying fishes is famous for the gliding and sailing ability which its members exhibit. In reality they glide rather than fly. Gaining speed under water with the aid of their tail, these fishes rise to the surface, spread their fins, and sail a short distance along the surface of the water. When they lose their speed, they fall back into the water to start off on another leap.

The members of the family have long, slender bodies and reach a length of eighteen inches. They are usually metallic-blue or bluish-green on the back and silvery beneath. They have short jaws and enlarged pectoral fins.

The flying fishes inhabit all the warm seas of the world, swimming near the surface in schools. The eggs of these fishes are attached to floating seaweeds. Unfortunately the flying fishes have many enemies. Dolphins and porpoises, the dolphin fish, tunnies, bonitoes, and albacores prey upon them.

Of more than sixty-five known species in this family, at least thirteen are known from the Hawaiian Islands.

Malolo

Also known as the Puhikii or Short-Winged Flying Fish

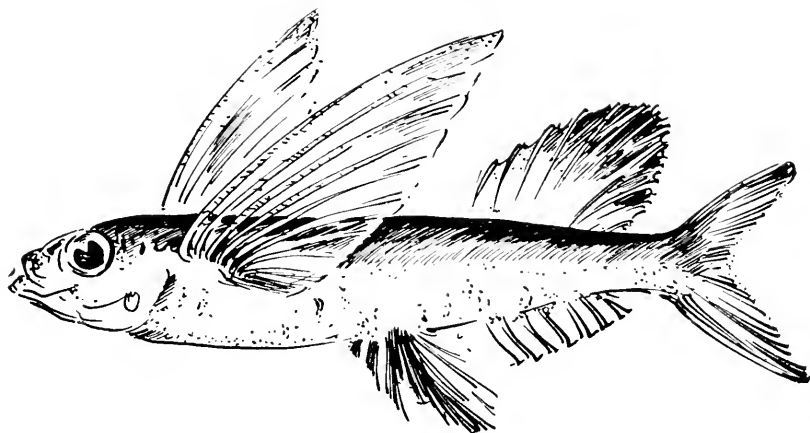
51-1 *Parexocoetus brachypterus* (Richardson)

Plate III, Figure 5

The malolo is the most numerous of the flying fishes about the Hawaiian Islands. The upper part of the body is usually a dark ultramarine blue while the lower surface is a silvery white. They reach a length of about seven inches.

Schools of this fish are common about the Hawaiian Islands during the summertime and may be seen near harbors and shorelines. It used to be a common fish in Honolulu markets during the summer season.

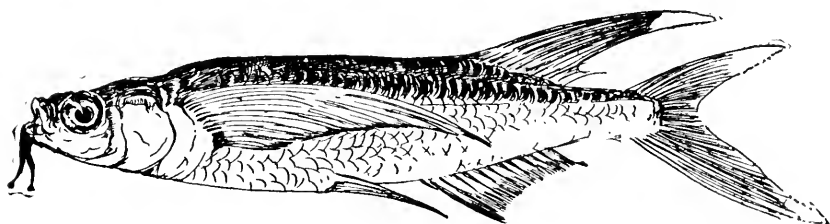
It is distributed throughout the Indo-Pacific area from China to the Hawaiian Islands.



Drawn from Jordan & Evermann

Flying Fish

51-2 *Parexocoetus melanogenion* (Pietschmann)



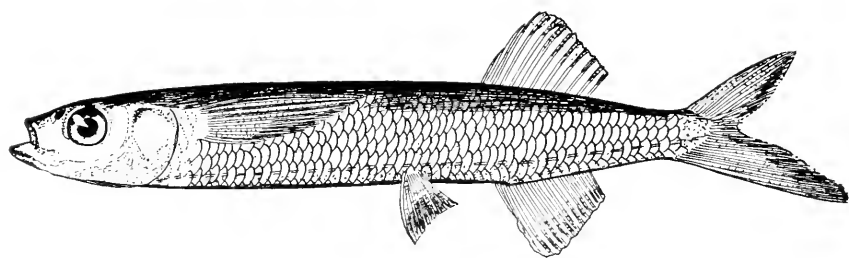
Drawn from Pietschmann

Only one specimen of this species is known. It was taken at Kona, Hawaii, in 1927 by T. T. Dranga and measured about six inches in length. In color it was bluish above and light beneath. The dorsal fin was white at the base, blacker toward the tip, while the tip itself was light in color. The chin contained a pair of barbels of a deep blackish color.

Malolo or Small-Winged Flying Fish

51-3 *Evolantia microptera* (Valenciennes)

This flying fish is of a steel-bluish color above, silvery-white beneath, and reaches a length of eight inches. It is distributed in both the tropical

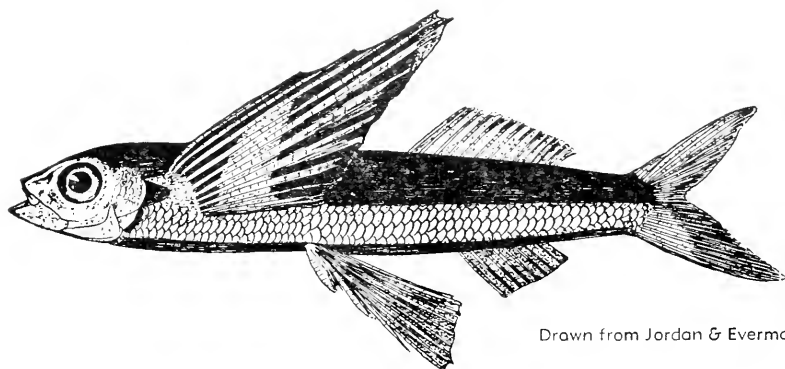


Drawn from Jordan & Evermann

and subtropical Atlantic and Pacific Oceans. It is found in the East Indies, Australia, Hawaii, and the Galapagos Islands.

Malolo or Common Flying Fish

51-4 *Exocoetus volitans* Linne



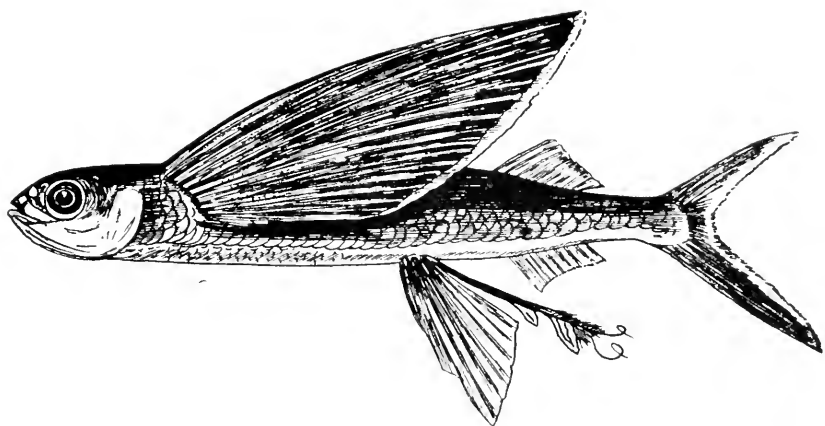
Drawn from Jordan & Evermann

The common flying fish is a steel-blue color above, silvery-white beneath, and reaches a length of eight inches. It has a very wide range, although it is nowhere abundant. It is circumtropical in distribution and ranges well into the temperate zones. It is reported to be rather common on the Atlantic coast of America. It is a warm sea species and occurs in the Hawaiian Islands.

Flying Fish

51-5 *Cypselurus oxycephalus* (Bleeker)

This flying fish is steel-blue in color above, silvery below, and reaches a length of about eleven inches. It is widely distributed, being found from

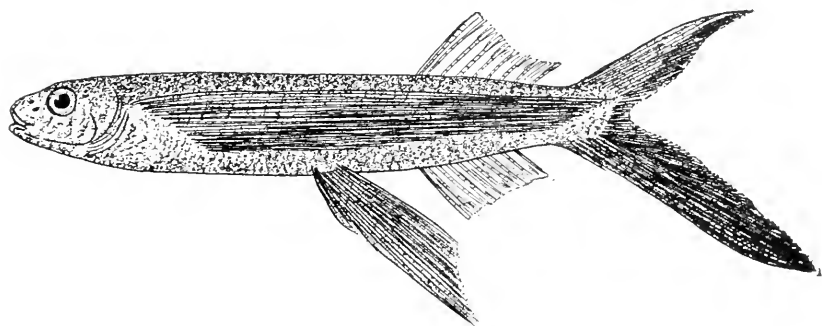


Drawn from Jordan & Evermann

Madagascar through the East Indies, to Australia, Samoa, and as far north as the Hawaiian Islands.

Flying Fish

51-6 *Cypselurus rondeletii* (Valenciennes)



This fish is described as drab gray or brownish above with the sides and lower surfaces silvery-white. The pectoral fins are dusky in color and the ventral fin is nearly black. It reaches a length of nearly eleven inches.

This fish is widely distributed and is probably circumtropical in its distribution. It is found in the Indo-Pacific area and has been recorded from the Hawaiian Islands. It also occurs in the Atlantic Ocean and Mediterranean Sea.

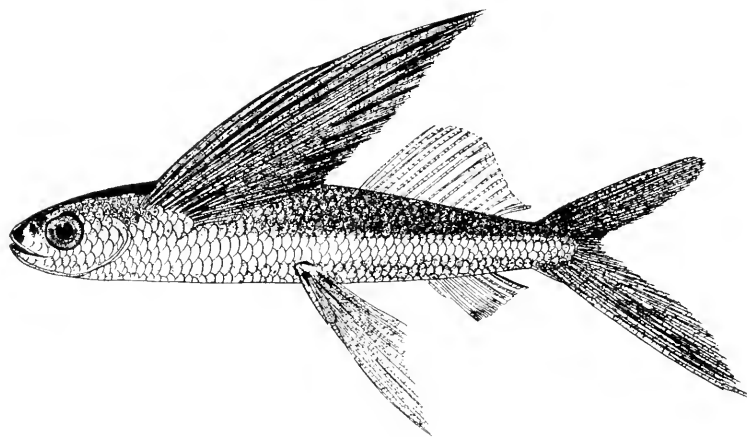
Flying Fish

51-7 *Cypselurus rubescens* (Rafinesque)

The fish was described as brown or bluish above and whitish on the sides and belly. It will reach a length of twenty inches. It is a circum-tropical species and is found in both the Atlantic and Pacific Oceans. It is known from the south Pacific area as well as the Hawaiian Islands.

Flying Fish

51-8 *Cypselurus altipennis* (Valenciennes)



Drawn from Jordan & Evermann

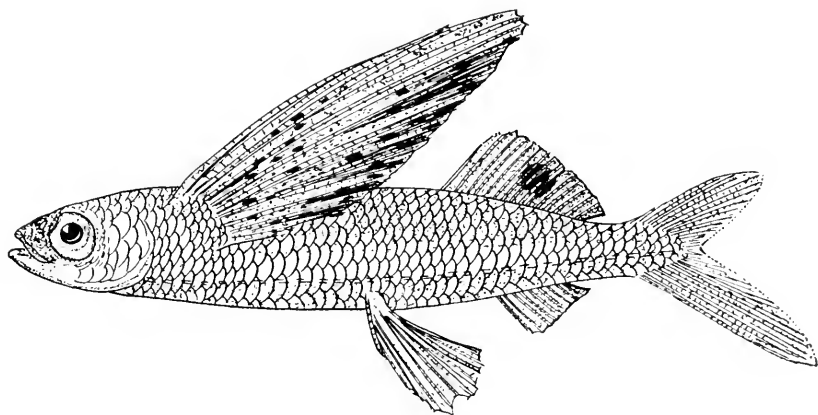
This flying fish is a blue violet-blackish or violet-slate color above and is whitish on the sides and the lower surface. It will reach a length of ten inches.

This fish is known to inhabit the warm tropical waters from the Cape of Good Hope through the Indian Ocean and the East Indies to Samoa and the Hawaiian Islands.

Flying Fish

51-9 *Cypselurus atrisignis* Jenkins

This fish is reported to be of a dark purple color above (in alcohol) and to be light in color below. The dorsal fin has a black spot in it. The fish will reach a length of fourteen inches.

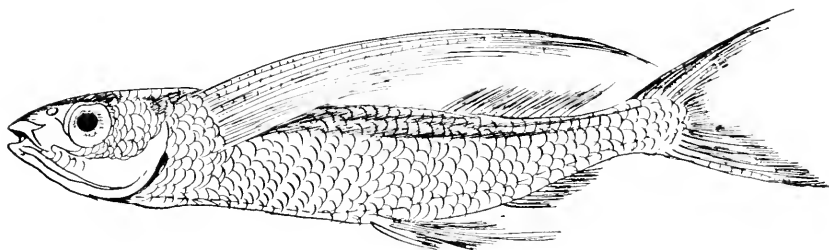


Drawn from Jordan & Evermann

This species is distributed from Malaca and the Caroline Islands to the Hawaiian Islands and probably elsewhere. It is not a common species.

Gregory's Flying Fish

51-10 *Cypselurus gregoryi* Pietschmann



Drawn from Pietschmann

This species is known from a single specimen. It was apparently of a bluish metallic color above and had a dark bluish band along the body from the pectoral fin to the base of the tail. The lower surface was pure white in color. The body measured about fifteen inches in length. The specimen was taken at Pearl and Hermes Reef and was named for Professor Herbert E. Gregory of the Bernice P. Bishop Museum in Honolulu.

Flying Fish

51-11 *Cypselurus spilopterus* (Valenciennes)

This flying fish (possibly a preserved specimen) was described as brownish above and as pale to white beneath. It measured about twelve inches in length. It is found from the Indo-Pacific and the Carolines eastward to Tahiti and the Hawaiian Islands.

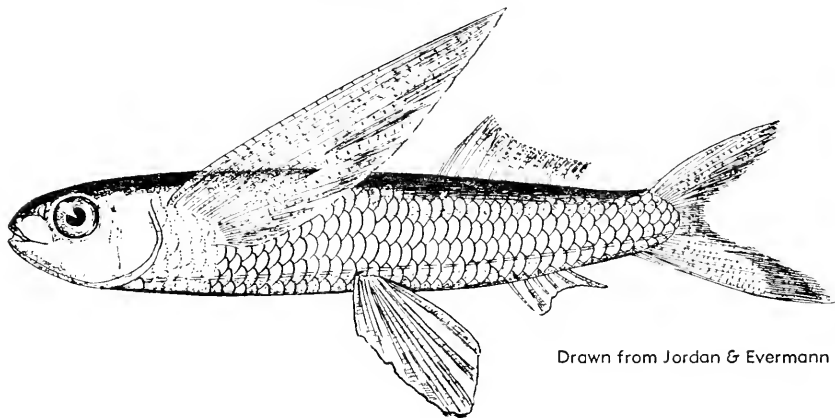
Flying Fish or Malolo

51-12 *Cypselurus babilensis* (Ranzani)

This flying fish was described as brownish above and silvery-white on the sides and belly. It measures about fifteen inches in length. It is a widely distributed species and is found in all of the tropical seas of the world including both shores of the Atlantic and Pacific Oceans.

Malolo or Common Flying Fish

51-13 *Cypselurus simus* (Valenciennes)



Drawn from Jordan & Evermann

This fish is described as a reddish purple above and white beneath. It reaches a length of about twelve inches. It is recorded from Melanesia and the Hawaiian Islands. It is reported to be the most common species about the Hawaiian Islands and the species most commonly seen from ships.

THE GRENADIER OR RAT-TAIL FISH FAMILY

52 Family *Coryphaenoididae* (*Macruridae*, *Macrouridae*)

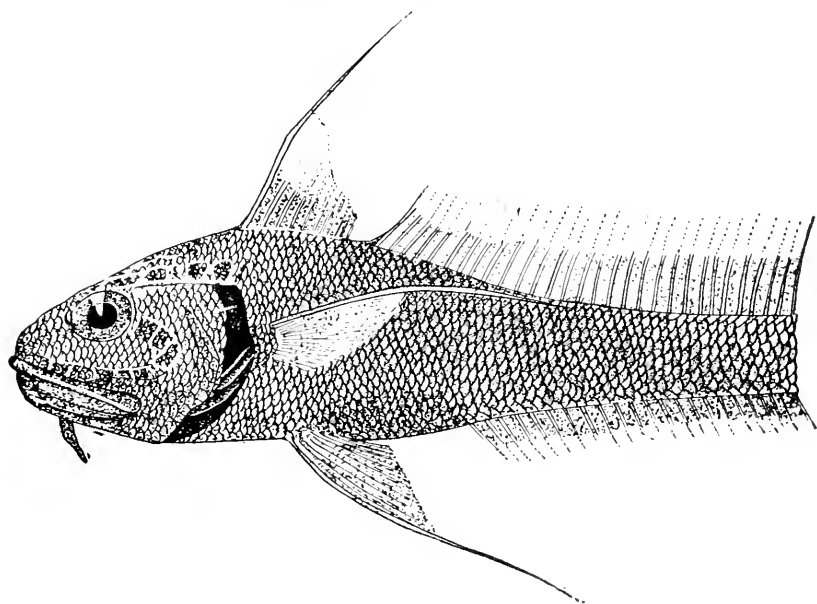
The Hawaiian members of this family are known only through the dredgings of the Albatross. The family seems to be a fairly large one and

to be confined to the ocean depths. In general appearance the fishes have a head like a codfish and usually have a barbel on the chin. The tail is long and tapering and the scales are usually rough and spinous. The species are usually fairly large in size and are of either a dull gray or black color.

Twenty-two members of this family have been recorded from the Hawaiian Islands.

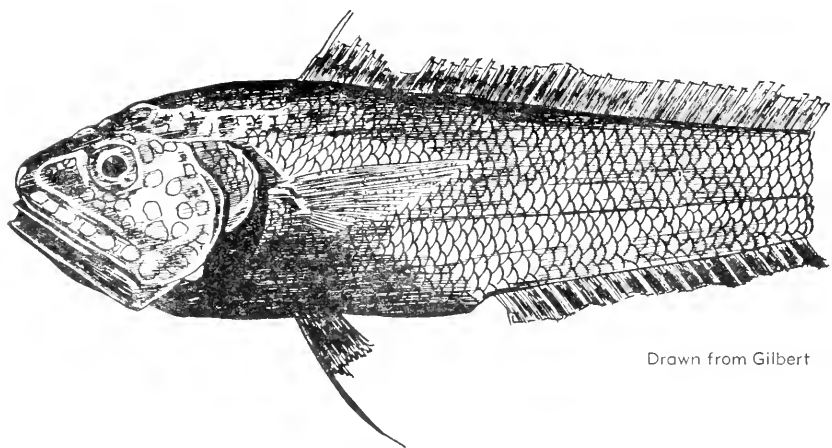
Rare Grenadier

52-1 *Bathygadus micronema* (Gilbert)



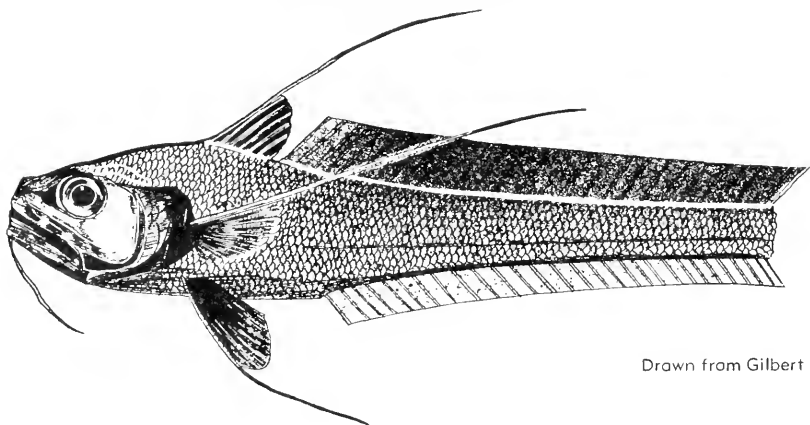
Drawn from Gilbert

This fish is known from a single specimen taken in the Pailolo Channel between Molokai and Maui between 753 and 787 fathoms. The head and the fins and upper portions of the body were light grayish above, while the lower parts of the body were dark brownish to black in color. The fish had small barbels on the lower jaw and measured about ten inches in length. The fins have a long filamentous ray attached to their free end.

Bower's Grenadier52-2 *Bathygadus bowersi* (Gilbert)

Drawn from Gilbert

This deep sea fish is brownish in color above, blue-black beneath, and measures about eighteen inches in length. The specimens were taken off Bird Island and off Kauai between 313 and 876 fathoms. Only six specimens are known.

Black-finned Grenadier52-3 *Gadomus melanopterus* Gilbert

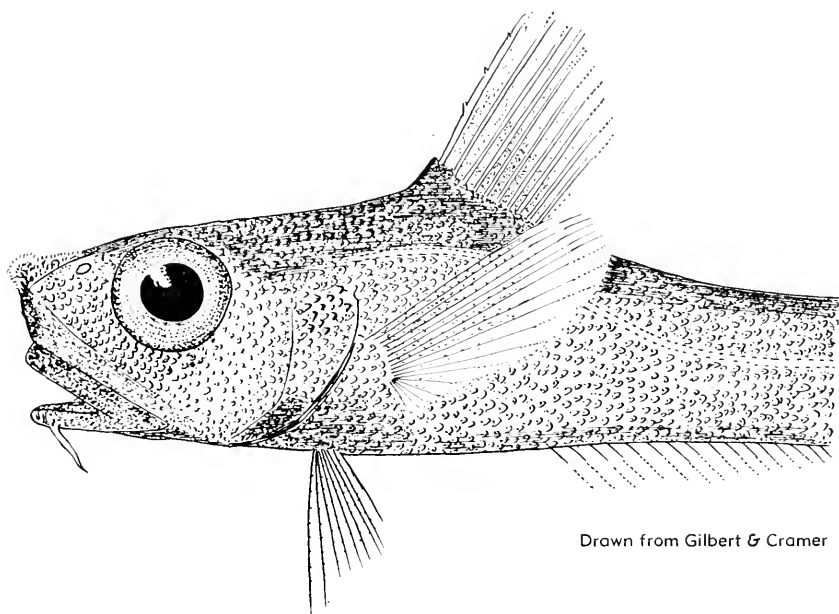
Drawn from Gilbert

The body and head of this fish are brownish in color above and darker below. The head and body are compressed and the second dorsal

and the anal fins extend along the body for some distance. The free ends of the fins extend as filaments and the lower jaw contains a barbel. The fish measured about a foot in length and was taken off Kauai between 444 and 557 fathoms.

Grenadier

52-4 *Coryphaenoides ectenes* (Gilbert & Cramer)

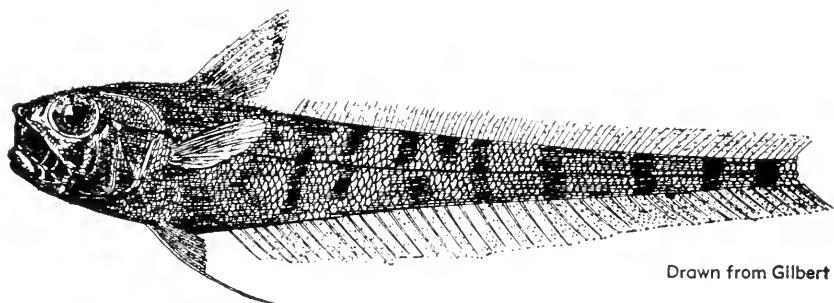


This grenadier fish is brownish-black in color and had a barbel on its lower jaw. It measured about six inches in length and was recorded from the Hawaiian Islands at a depth of 313 fathoms.

Rare Grenadier

52-5 *Corpybaenoides bobetatus* (Gilbert)

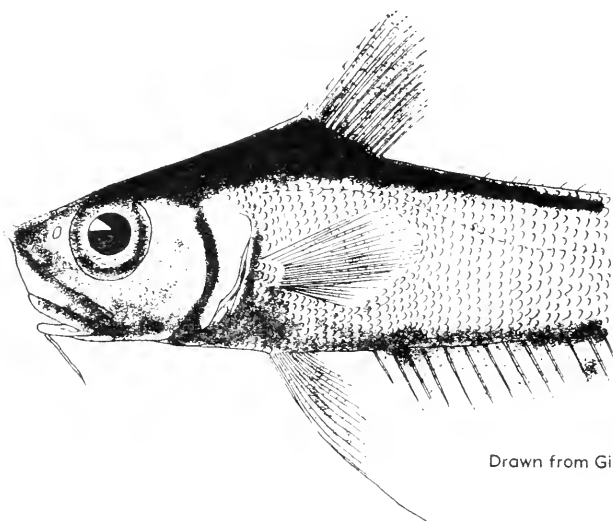
This fish is grayish on the back and sides and jet black in color beneath. The ventral fin has a terminal filament. The only specimen of this fish known was taken off Oahu between 299 and 323 fathoms. It measured about five inches in length.



Drawn from Gilbert

Grenadier

52-6 *Coryphaenoides propinquus* (Gilbert & Cramer)



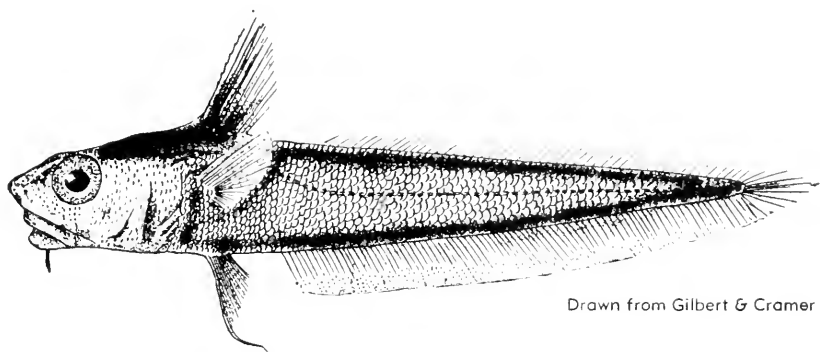
Drawn from Gilbert & Cramer

This grenadier fish was brownish in color and measured about eight to ten inches in length. It was taken off Kauai and elsewhere from 286 to 476 fathoms. A few specimens of this rare fish are preserved in the U.S. National Museum.

Grenadier

52-7 *Coryphaenoides holocentrus* (Gilbert & Cramer)

This fish has a very slender head and trunk and measures about eight inches in length. It is light brownish in color and was taken off Oahu

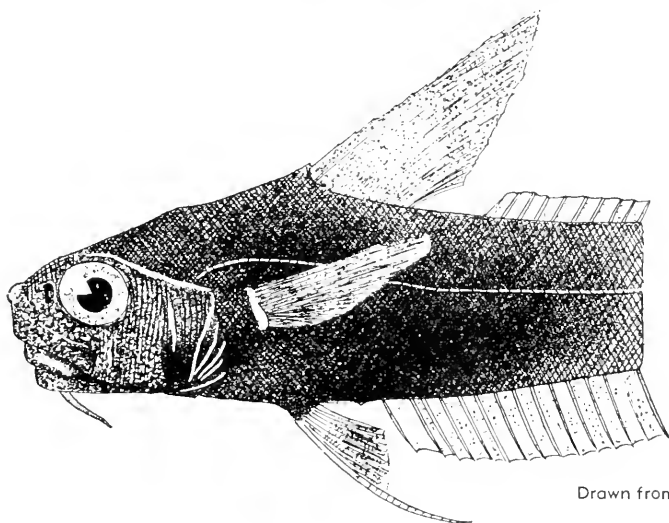


Drawn from Gilbert & Cramer

and elsewhere in the Hawaiian Islands at depths between 308 and 375 fathoms.

Burrage's Grenadier Fish

52-8 *Coryphaenoides burragei* (Gilbert)

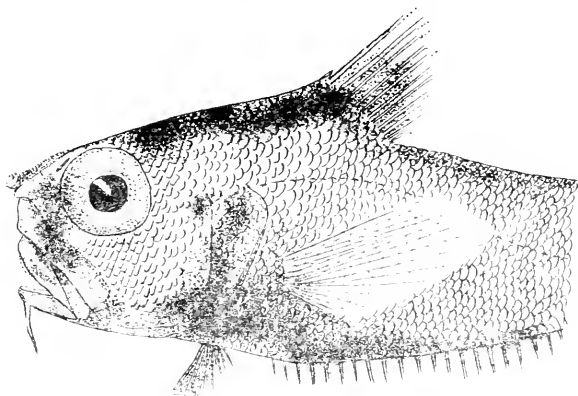


Drawn from Gilbert

This grenadier fish is light grayish above in color and dusky to blackish below. It measures about ten inches in length and was taken in the Hawaiian Islands between 294 and 330 fathoms. It was named for Lieut. G. H. Burrage of the U.S. Navy, who was the navigating officer aboard the Albatross.

Grenadier

52-9 *Coryphaenoides gibber* (Gilbert & Cramer)

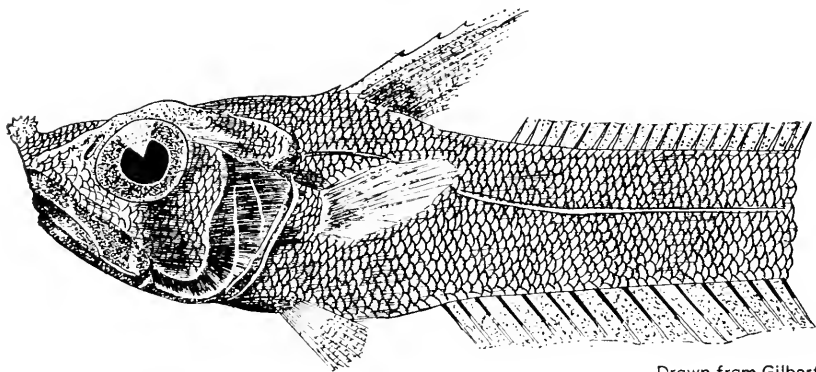


Drawn from Gilbert & Cramer

This grenadier fish is brownish in color and reaches a length of about eight inches. It is known only from the Hawaiian Islands and was taken between 351 and 800 fathoms.

Rare Grenadier

52-10 *Coryphaenoides obliquatus* (Gilbert)

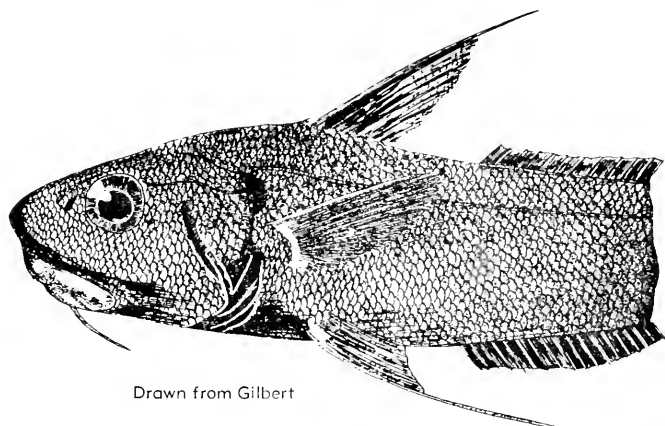


Drawn from Gilbert

Only a single specimen of this fish has ever been seen. It had a long and slender body, was grayish in color, measured about six inches in length, and had a tubercle on its snout. It was taken between 437 and 632 fathoms off the east coast of Kauai.

Long-spined Grenadier

52-11 *Coryphaenoides longicirrhus* (Gilbert)

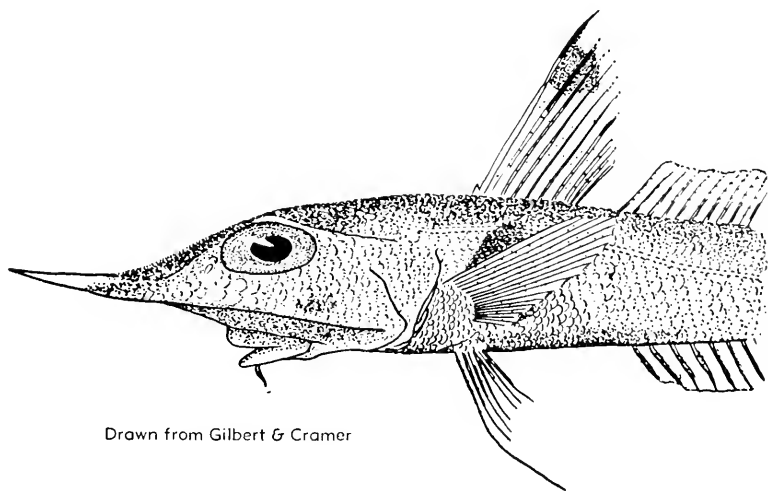


Drawn from Gilbert

This fish was named for the filament on the ventral fin. It measured about two feet in length, was of a dark purplish-brown color, and contained a barbel beneath the jaw. The only specimen known to science was taken off Kauai between 1,000 and 1,314 fathoms.

Grenadier

52-12 *Coelorhynchus gladius* Gilbert & Cramer

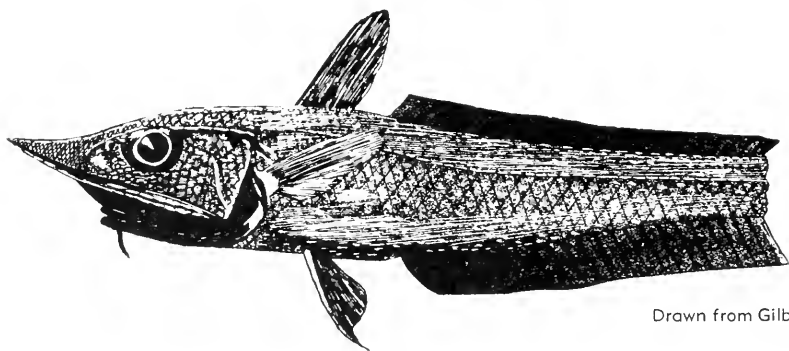


Drawn from Gilbert & Cramer

This grenadier was taken off the Islands of Oahu and Kauai between 192 and 352 fathoms. It was a light brown color and measured about seven inches in length. Only six specimens are known of this deep sea fish.

Rare Grenadier

52-13 *Coelorhynchus aratrum* Gilbert

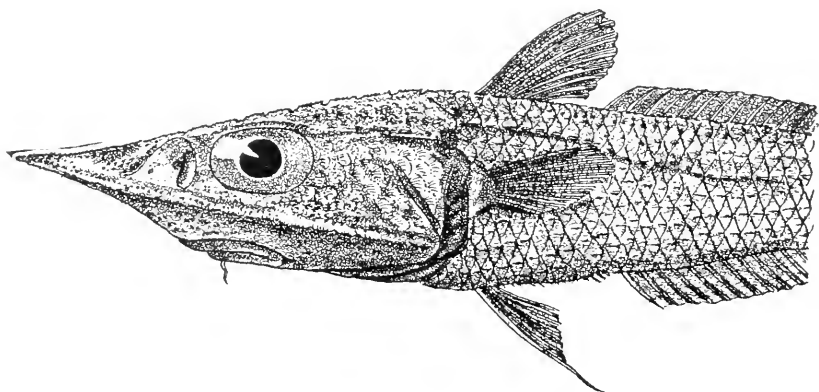


Drawn from Gilbert

This grenadier fish is known from only three specimens all of which were taken in the Hawaiian Islands between 289 and 337 fathoms. It is light brown in color above and whitish beneath and measures about one foot in length.

Grenadier

52-14 *Coelorhynchus doryssus* Gilbert

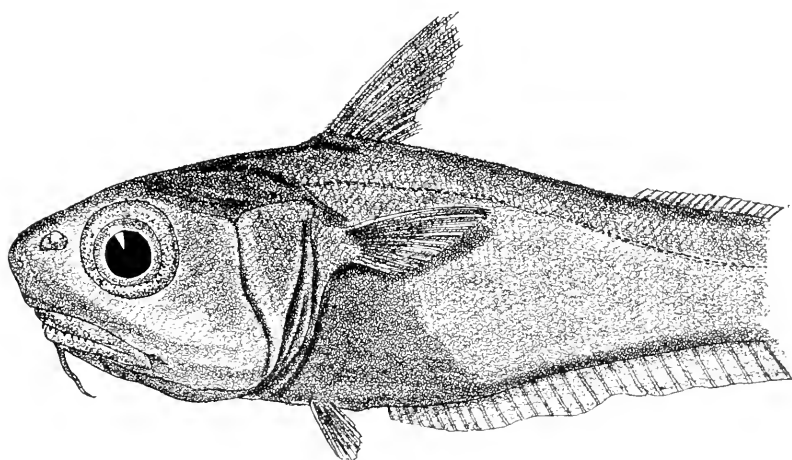


Drawn from Gilbert

This grenadier fish lives in the deeper off shore waters and was taken between 192 and 449 fathoms. It was gray in color, had a pointed beak, a short barbel on its chin, and measured about fourteen inches in length.

Hawaiian Grenadier

52-15 *Malacocephalus hawaiiensis* Gilbert



Drawn from Gilbert

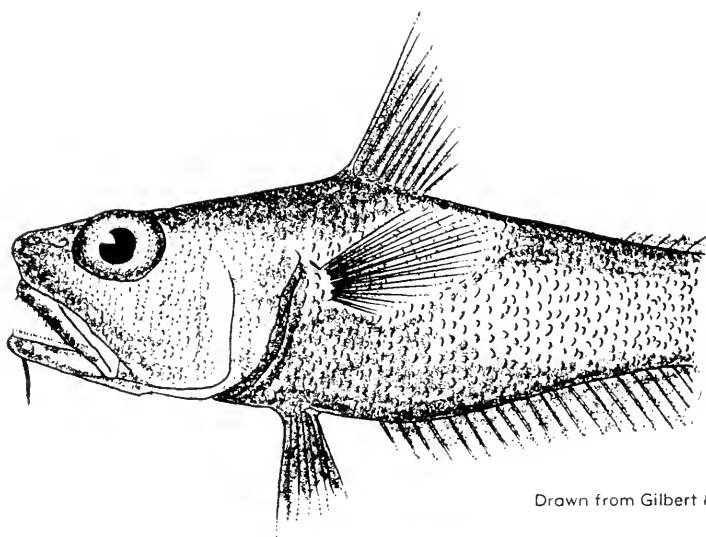
This grenadier is olive brown in color above and blackish beneath. It has a barbel on its chin and measures about fourteen inches in length. It was taken between 165 and 351 fathoms at various places in the Hawaiian Islands.

The stomach contents of this fish included shrimp-like crustaceans and many eyes and jaws of squids; the latter probably forms its diet.

Grenadier

52-16 *Ventrifossa atherodon* (Gilbert & Cramer)

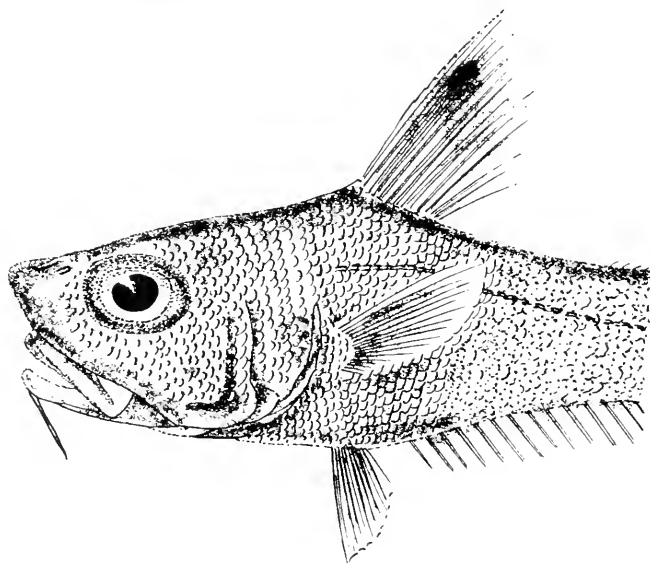
This fish is one of the most abundant species between 250 and 400 fathoms in Hawaiian waters. It is a bright blue color above, silvery on the sides, bluish-black beneath, and reaches a length of about fifteen inches. It feeds on shrimp-like crustaceans and squids.



Drawn from Gilbert & Cramer

Common Grenadier

52-17 *Ventrifossa ctenomelas* (Gilbert & Cramer)



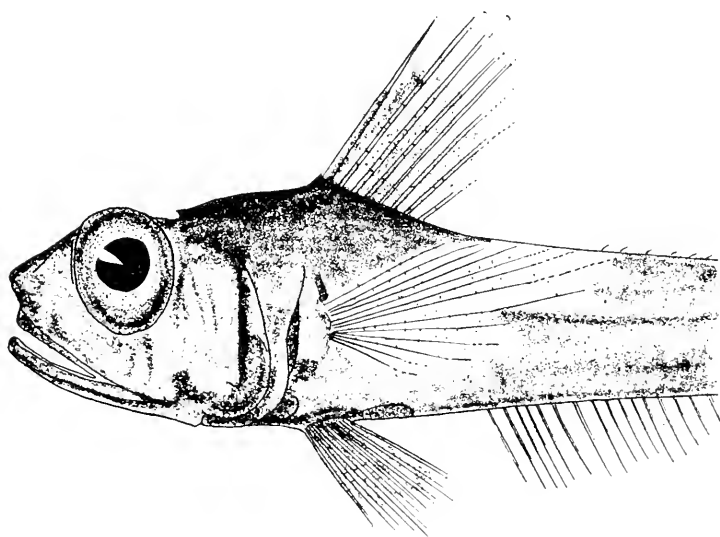
Drawn from Gilbert & Cramer

This grenadier is one of the most common in Hawaiian waters and is very abundant at depths between 250 and 350 fathoms. It was a brownish color above with silvery sides and blackish below.

Since its stomach contained the remains of shrimp-like crustaceans and the eyes and jaws of squids, these animals must make up the bulk of its diet.

Grenadier

52-18 *Hymenocephalus antraeus* Gilbert & Cramer



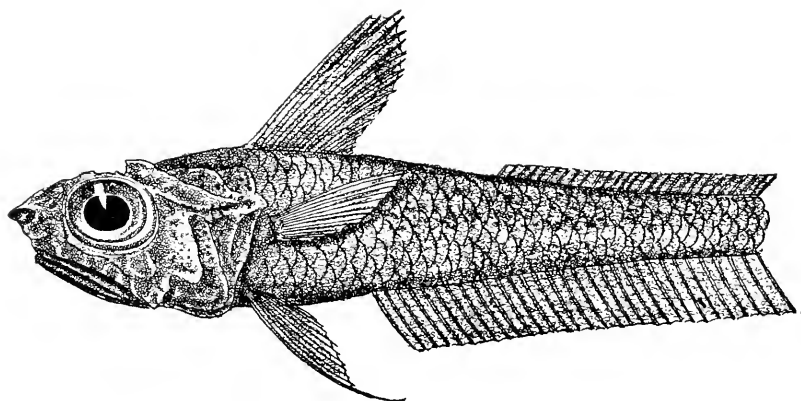
Drawn from Gilbert & Cramer

This grenadier is one of the most abundant species about the Hawaiian Islands in depths from 250 to 350 fathoms. It is dark brownish in color and measures about eight inches in length.

Grenadier

52-19 *Hymenocephalus striatulus* Gilbert

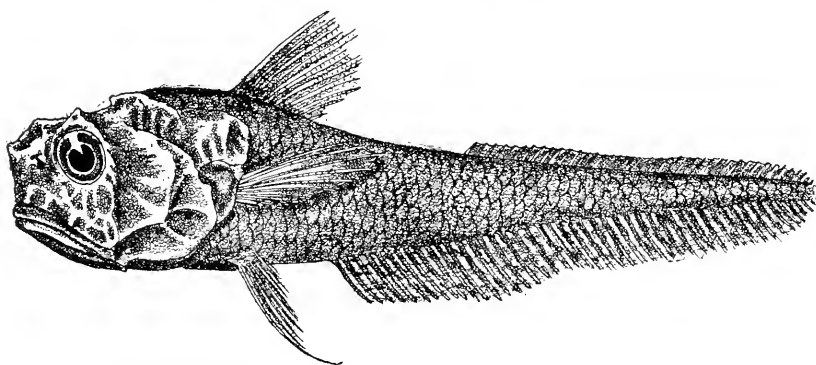
This grenadier is a light olive brown color above, dark beneath, and reaches a length of about two inches. It is taken in depths from 192 to 362 fathoms, but it is not a common species.



Drawn from Gilbert

Grenadier

52-20 *Hymenocephalus aterrimus* Gilbert



Drawn from Gilbert

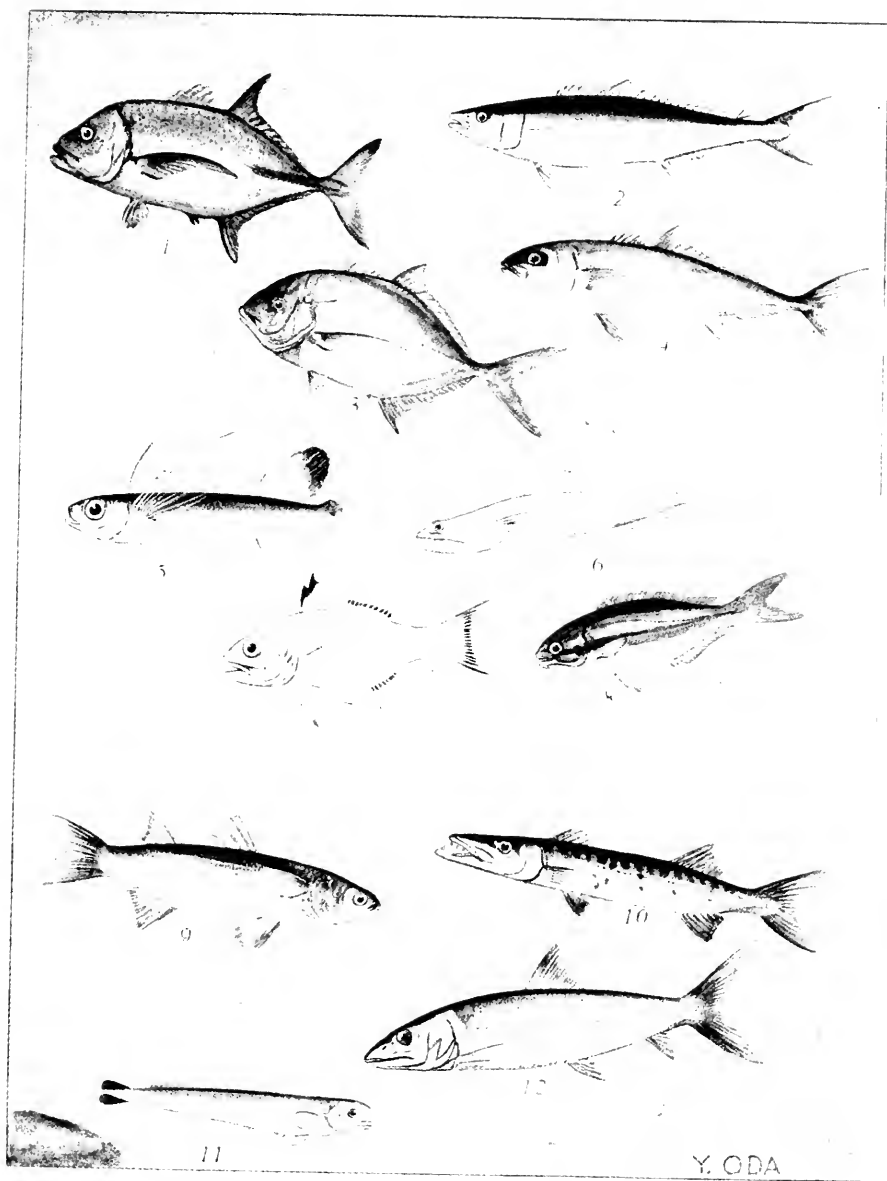
This grenadier fish is of a uniform black color and measures about seven inches in length. It was taken between 293 and 800 fathoms, but it is not a common species.

Grenadier

52-21 *Metaeocephalus acipenserinus* (Gilbert & Cramer)

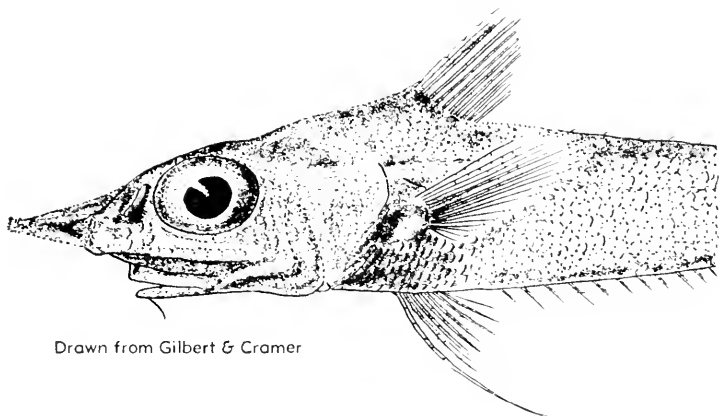
This grenadier is light brownish in color and measures about eight inches in length. It is very abundant at depths from 200 to 400 fathoms.

Plate III



1. Blue Grevally
2. Runner
3. Paopao
4. California Yellowtail
5. Malolo
6. Ulu

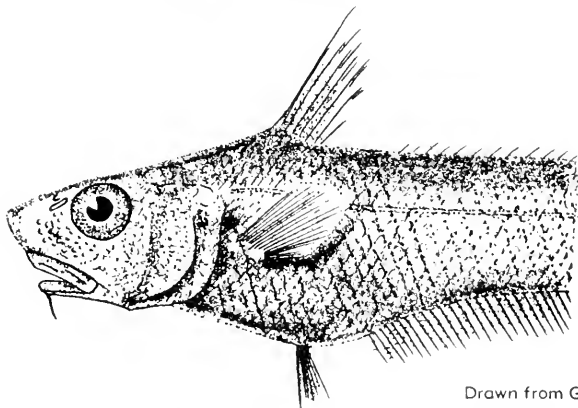
7. Cardinal Fish
8. Azure Chopi
9. Common Striped Mullet
10. Great Barracuda
11. Makai
12. Oio



Drawn from Gilbert & Cramer

Grenadier

52-22 *Trachomurus sentipellis* Gilbert & Cramer



Drawn from Gilbert & Cramer

This grenadier is dark brown in color in front, but becomes lighter posteriorly. It reaches a length of about one foot. It is a rare species and lives at depths from 375 to 804 fathoms. Only fourteen specimens have ever been seen.

THE COD-FISH OR LING FAMILY

53 Family *Gadidae*

The family of the cod-fishes is a well known group because they are important food fishes and form the basis for an industry. They all have

a white, flaky, rather tasteless flesh, but because the flesh takes salt readily and is peculiarly adapted for drying, it is preserved in large quantities. The oil of these fishes has been extracted and used in the treatment of several diseases.

The codfishes average about ten pounds each and all have three dorsal fins and a barbel on their chin. They include the common codfish, the Alaskan cod, the haddock, the pollack, coalfish or green cod, the whiting, the tom cod, and the rockling.

The family of the cods inhabits the northern seas, although there are a few tropical species. A few species venture into the ocean depths and one genus (*Lota*) called the American burbot, ling or lawyer is confined to fresh water.

Of more than 140 known species, three are known from Hawaiian waters.

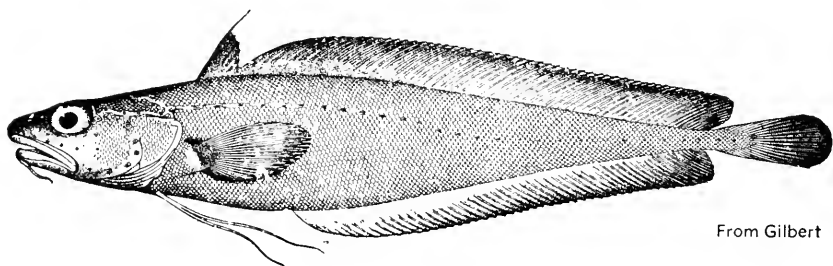
Deep Water Codfish

53-1 *Antimora microlepis* Bean

This codfish is light gray or olivaceous in color and reaches a length of about eighteen inches. It was taken in the Hawaiian Islands at depths from 1,000 to 1,314 fathoms. It also occurs in deep water along the western coast of North America from southern California to the Bering Sea.

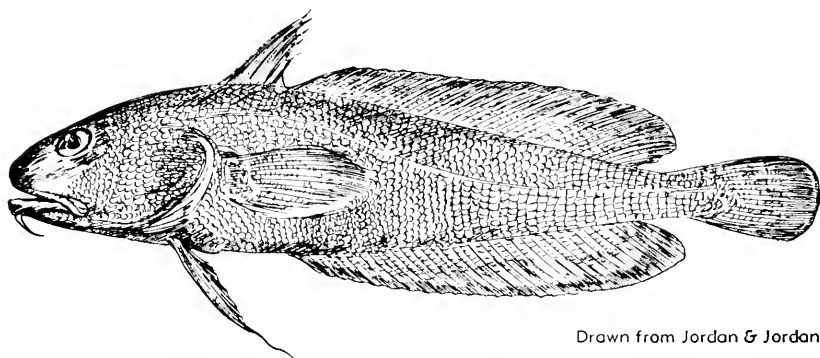
Rare Codfish

53-2 *Laemonema rhodochir* Gilbert



Only one specimen of this fish is known to science. It was a light brownish color above, a pale blue color beneath, and measured about four inches in length. It was taken between 53 and 211 fathoms off the south coast of Oahu.

Codfish

53-3 *Physiculus kaupi* Poey

Drawn from Jordan & Jordan

Very little is known of the habits of this rare fish. It measured about one foot in length and has been recorded from both Cuba and the Hawaiian Islands.

'THE CRESTED BANDED FISH OR OAR FISH FAMILY

54 *Family Lophotidae*

This family contains one or at least a very few species of scaleless, ribbon-shaped, deep sea fishes. In addition to a long body, the dorsal fins form a high crest in front of the head. They are all oceanic fishes and are found in the surface waters of all of the seas of the world.

One member of this family occurs in waters surrounding the Hawaiian Islands.

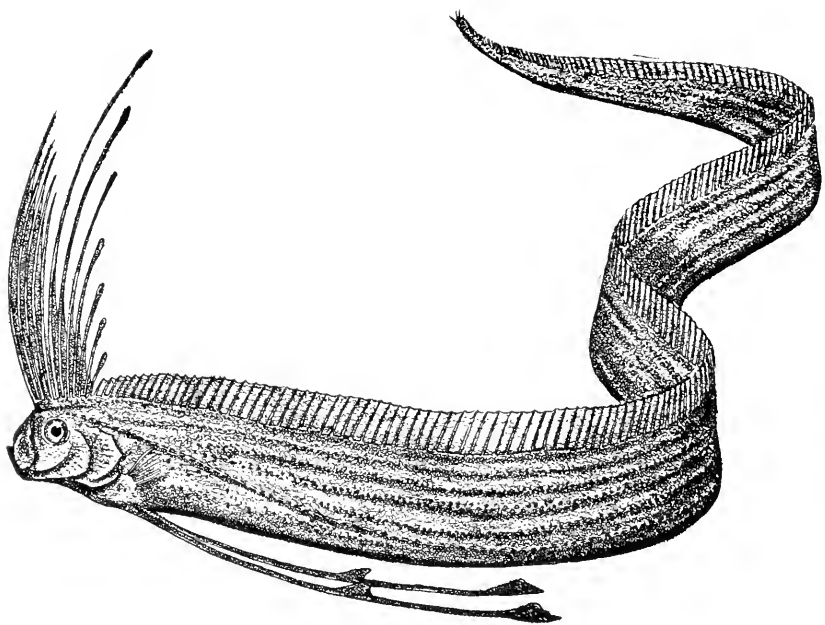
Oarfish or King-of-the-Herring Fish

54-1 *Lophotes capellei* Schlegel

Plate I, Figure 11

The body of the oarfish is long and ribbon-shaped and is studded with bony tubercles. The body of this fish is of a silvery color and is tinged with blue on the head. The body is marked with dark spots and oblique streaks. The fins are all red in color. Specimens in alcohol are of a silvery gray color. The oarfish will reach a length of twenty feet and weighs over 600 pounds. It is a rare and most unusual fish.

The oarfish is probably world-wide in its distribution. It is pelagic over the entire Pacific Ocean.



THE MARIPOSA, OPAH, OR MOONFISH FAMILY

55 Family *Lampridae*

This family contains a single species called the opah or moonfish. It is a fish of large size and brilliant color inhabiting the open sea of the Atlantic and Pacific Oceans.

Opah or Moonfish

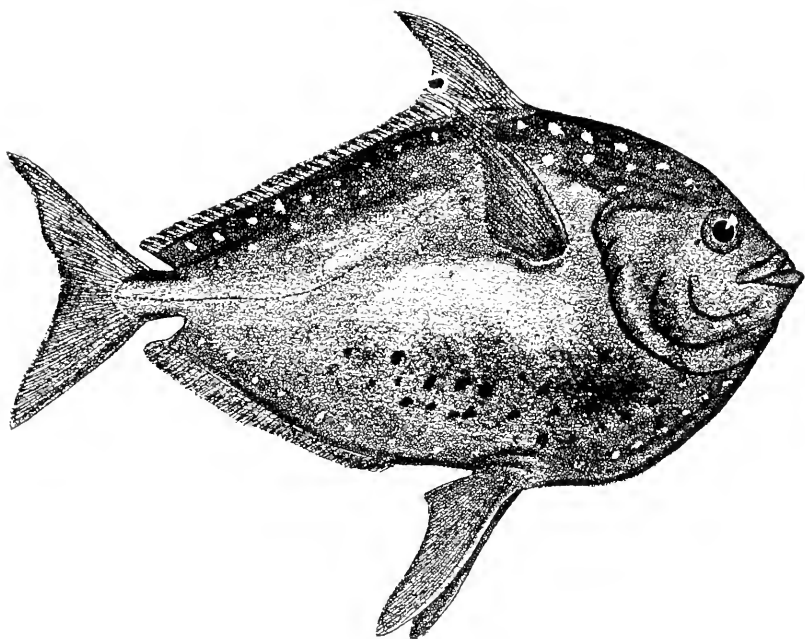
Also known as the Mariposa, Cravo, Jerusalem Haddock,
and San Pedro Fish

55-1 *Lampris regius* (Bonaterre)

Plate I, Figure 9

The body of this fish is short and deep and the sides are strongly compressed. The skeleton is strong and there are no teeth. The fish is described as colored with a rich brocade of silver and lilac, rosy on the belly, and everywhere covered with round silvery spots. The jaws and the fins are vermillion.

The fish will reach a length of six feet and weighs 600 pounds. The moonfish feeds on young fishes, cuttlefish and crustaceans. The flesh of



the opah is firm, rich, of a reddish shade somewhat like the tunnies, and is unsurpassed as food. It has been described as rich, firm, delicate, and oily.

Although widely distributed the fish is quite rare. It is found in open water in both the Atlantic and Pacific Oceans. It is a slow swimmer and lives in the waters from the surface to depths of one hundred feet.

THE FLOUNDER, HALIBUT, OR FLATFISH FAMILY

56 *Family Pleuronectidae*

The members of the flounder family have bodies which are strongly compressed and which are oval or elliptical in outline. They all go through a very unusual development before reaching the adult stage. They begin life swimming in an upright position as other fishes do, but they desert this upright position as they grow older and turn over onto one side. The eye on the lower side moves around to the upper side so that both eyes come to lie on the same side of the body. While the upper side is usually pigmented the lower side is usually plain. The mouth is sometimes distorted and the pectoral fins are unequal.

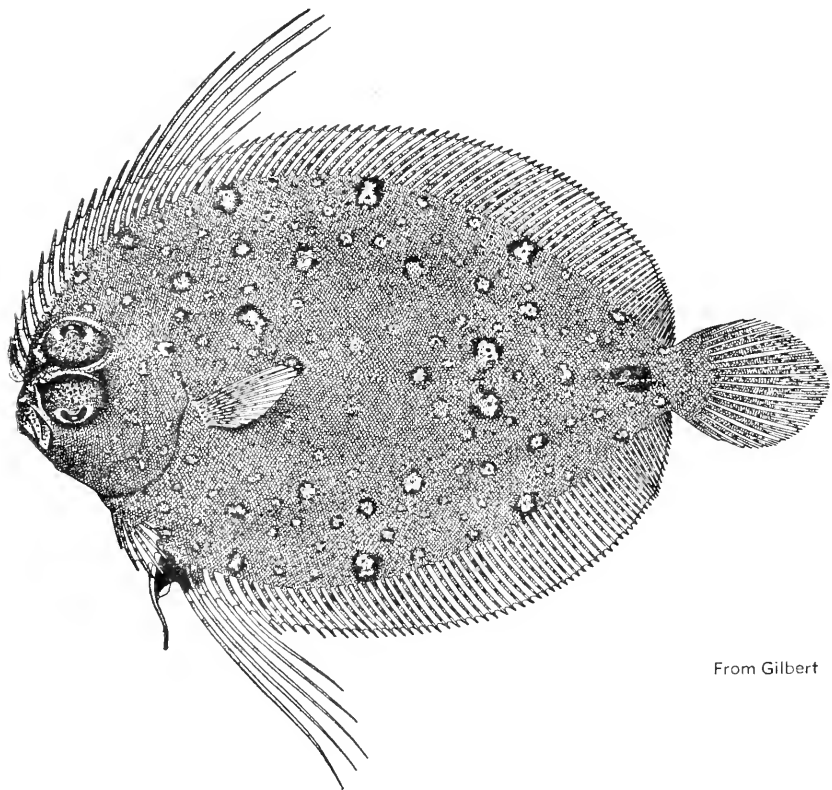
The larger members of the group reach a length of ten or twelve feet and will weigh as much as 500 pounds.

The members of this family are mostly carnivorous and are distributed on sandy bottoms from the poles to the tropics. They are abundant in the colder regions and there provide many important food fishes. Considering the size of the family, they are poorly represented in the tropics.

Of more than 500 known species, at least fourteen are known to occur in the Hawaiian Islands.

Flounder

56-1 *Taeniopsetta ocellatus* (Gunther)



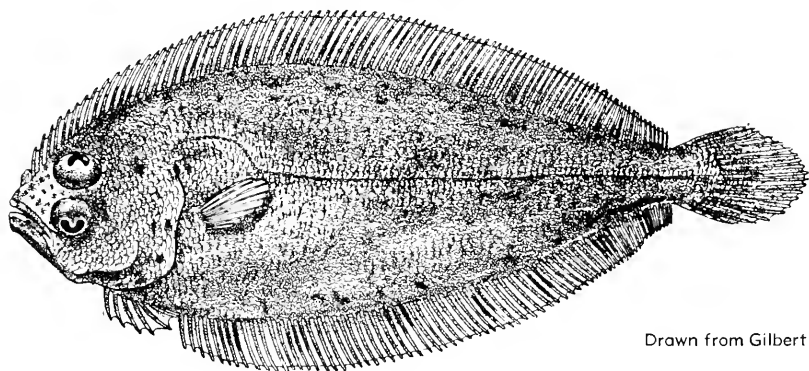
From Gilbert

This flounder is light olive brown in color above and is finely speckled and mottled with dark brown. Hawaiian specimens measure about five inches in length and occur between 99 and 220 fathoms. The species

is found elsewhere in the Pacific Ocean and may be even more widely distributed.

Flounder

56-2 *Anthicitharus debilis* Gilbert

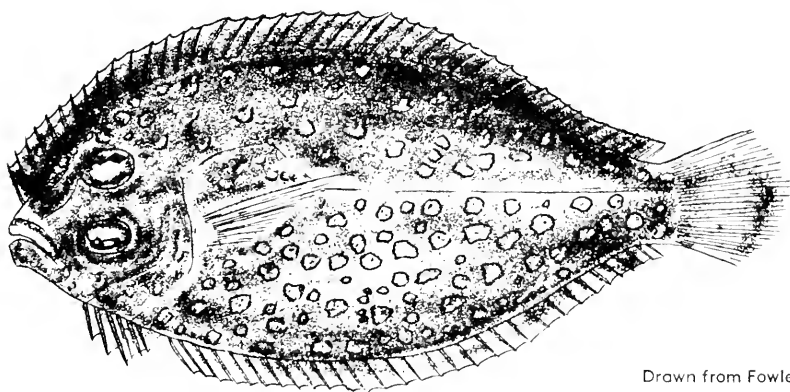


Drawn from Gilbert

This flounder is known from ten Hawaiian specimens taken between 122 and 220 fathoms. They measured about seven inches in length and had slender, thin, fragile, transparent bodies. They were light olive-brown in color above and finely speckled.

Pakii

56-3 *Platophrys mancus* (Broussonet)



Drawn from Fowler

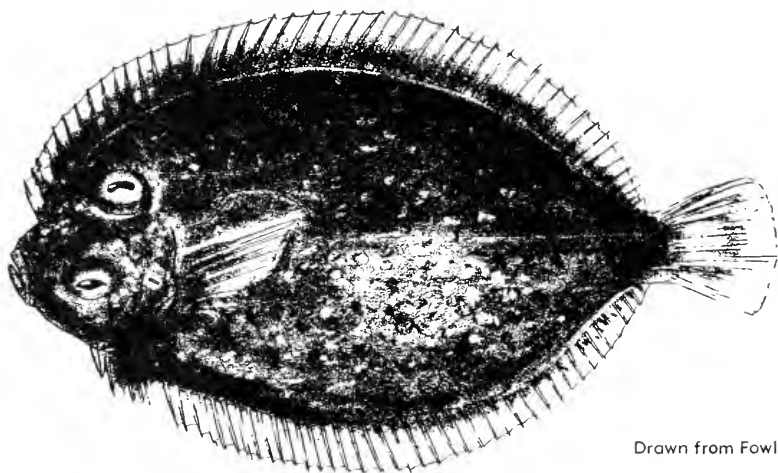
This flounder is mottled gray and brown on its left or upper side, while the right or lower side is a milky white color with pale brown dots.

This fish measures as much as sixteen inches in length. The dorsal rays number about 95 while the anal rays number about 78. The young are entirely transparent and are often taken in tow nets at the surface. They are often caught in dredges at less than 75 fathoms, and are sometimes sold in Honolulu markets.

This fish is widely distributed in the Indian and Pacific Oceans. It is found from Cocos Island through the East Indies and Polynesia to Hawaii.

Thompson's Flounder

56-4 *Platophrys thompsoni* Fowler



Drawn from Fowler

Only one specimen of this rare flounder is known. It measured about five inches in length and was taken at Honolulu. The dorsal fin contained 86 rays and the anal fin 62 rays. It is preserved in the Bishop Museum.

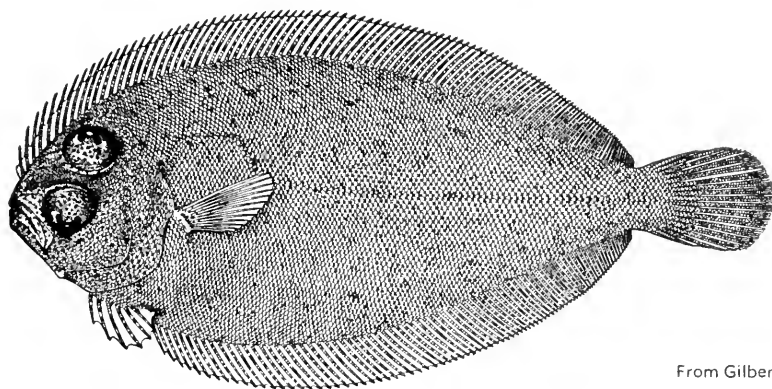
Pakii or Uiui

56-5 *Platophrys pantherinus* (Ruppell)

This fish is a sand color in life, has a compressed, ellipsoidal body, and will reach a length of eight or ten inches. It resembles *P. mancus* but is smaller in size. The dorsal fin contains from 85 to 93 rays while the anal fins contains from 65 to 70 rays.

This flounder is found from the Red Sea through the Indian Ocean, the East Indies, Tahiti, Samoa, and the Hawaiian Islands. It is one of the common species in the Hawaiian Islands.

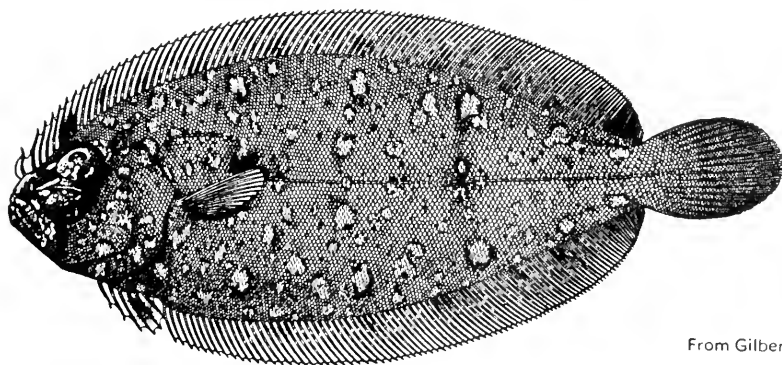
Flounder

56-6 *Platophrys chlorospilus* Gilbert

From Gilbert

This flounder is olive gray in color and is flecked or spotted with olive brown spots. It reaches a length of about seven inches. It is known only from the Hawaiian Islands and has been taken between 78 and 173 fathoms.

Flounder

56-7 *Platophrys coarctatus* Gilbert

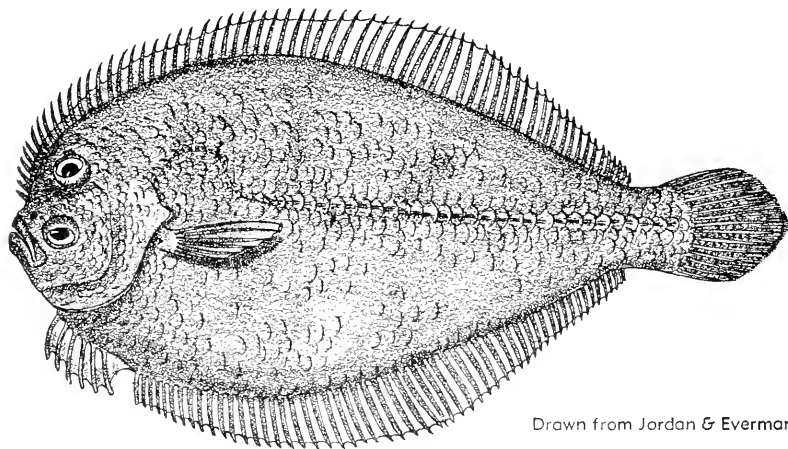
From Gilbert

This flounder is light olive brown in color and is covered with irregular dark ringed green spots. It reaches a length of about seven inches. It was taken between 138 and 220 fathoms and is known only from the Hawaiian Islands.

Hawaiian Flounder

56-8 *Engyprosopon hawaiiensis* Jordan & Evermann

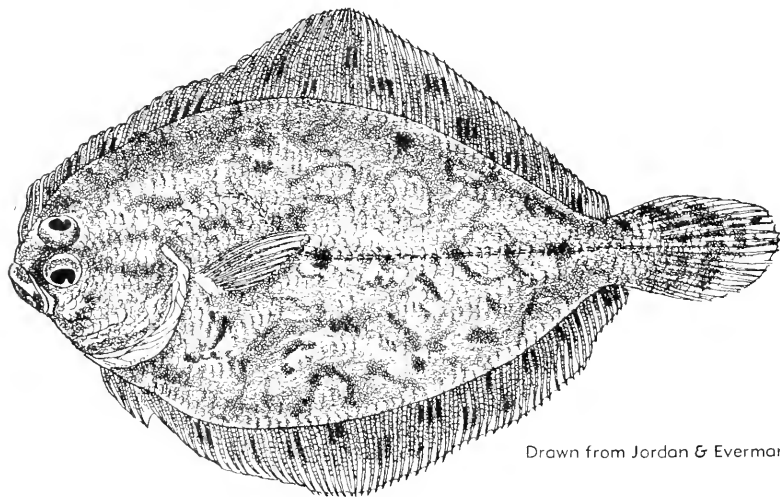
The body of this flounder is finely speckled or dotted with dusky markings which vary to blackish. The lower or right side is dull creamy or brownish white. This fish reaches a length of about four inches. It is found at depths of ten to fourteen fathoms and is known only from the Hawaiian Islands.



Drawn from Jordan & Evermann

Rare Flounder

56-9 *Engyprosopon arenicola* Jordan & Evermann

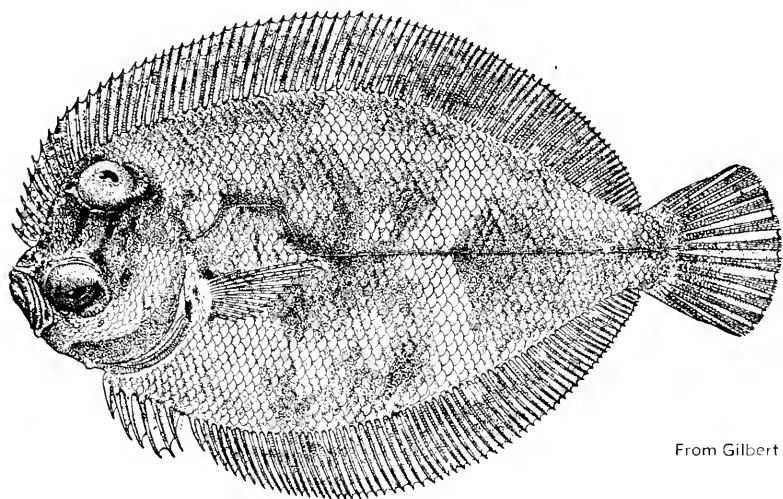


Drawn from Jordan & Evermann

This species resembles *E. hawaiiensis* very closely and may even be the same species. It is a pale brown color in alcohol and is marked on the sides with many incomplete rings. The species is known from only two specimens from Hilo, both of which were less than three inches in length.

Flounder

56-10 *Scaeops xenandrus* (Gilbert)



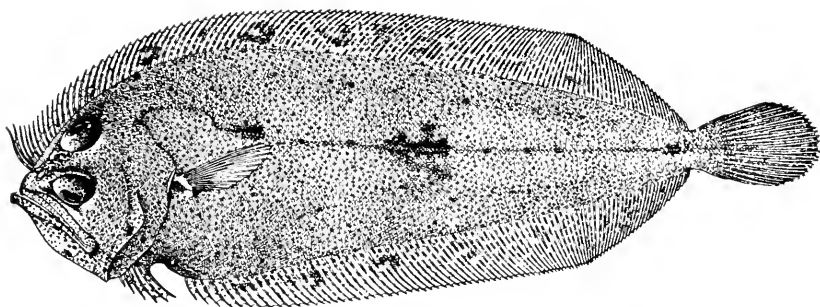
From Gilbert

The left or upper side of this flounder is grayish in color with blackish shading and mottlings and with three poorly defined black spots along the middle of the side. The right or lower side was whitish near the head and grayish near the tail. This flounder reaches a length of about four inches and is very abundant between 40 and 100 fathoms. It is known only from the Hawaiian Islands.

Rare Flounder

56-11 *Chascomopsetta prorigera* Gilbert

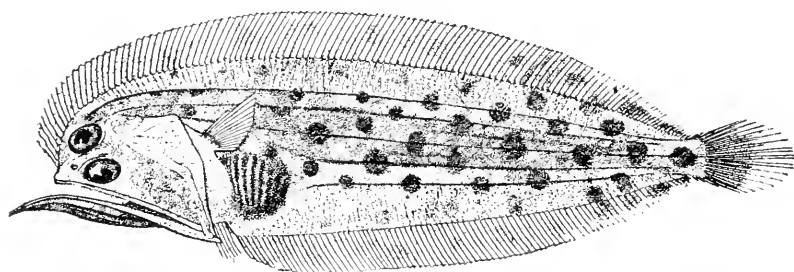
This flounder is light olive in color above and is flecked with light brown. It has a slender body and measures about nine inches in length. The only specimen known was taken in the Hawaiian Islands between 178 and 202 fathoms.



From Gilbert

Flounder

56-12 *Pelecanichthys crumenalis* Gilbert & Cramer



Drawn from Gilbert & Cramer

This flounder was a light brown color and measured about ten inches in length. It was described as a most peculiar flounder and having an enormous mouth with a gape as long as the head.

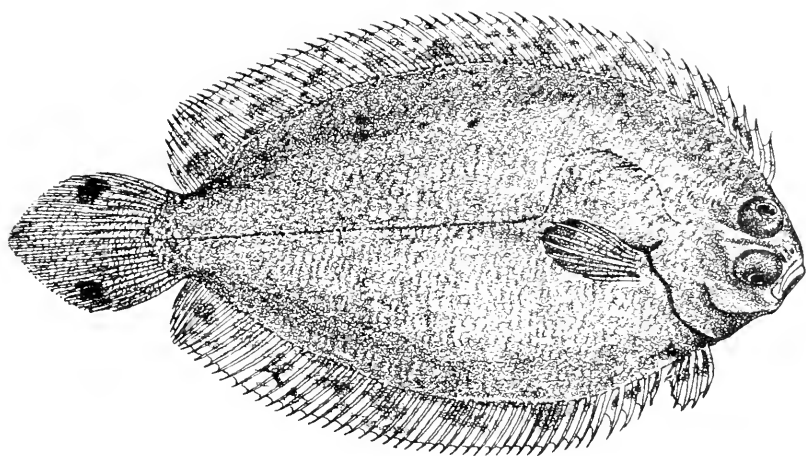
It was taken sparingly on sandy and muddy bottoms at depths from 238 to 344 fathoms. It was found only in Pailolo Channel between Maui and Molokai and in its approaches and in the southerly continuations of the Kaiwi Channel between Molokai and Oahu.

The food of this peculiar flounder consists of shrimp and other small crustacea.

Hawaiian Flounder

56-13 *Poecilopsetta hawaiiensis* Gilbert

This flounder is a light olive brown color on its right side and is marked with fine brown spots and bars. The tail fin contains a pair of large black spots. The fish measured about five inches in length and

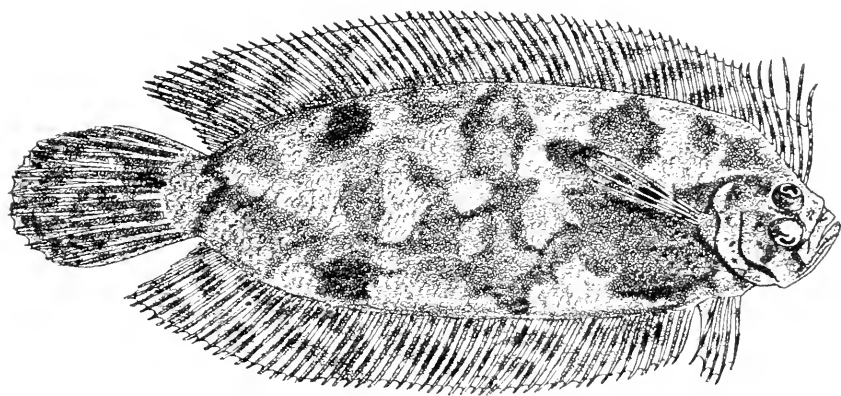


Drawn from Gilbert

was taken in Pailolo Channel between Molokai and Maui and off Oahu between 128 and 238 fathoms. This fish is known only from the Hawaiian Islands.

Coralline Flounder

56-14 *Samaris corallinus* (Gilbert)



Drawn from Gilbert

This flounder was coralline red in color on its right side and was mottled and spotted with blackish and pearly gray and pinkish white. It was also marked with two round black spots with small orange centers

along the margins of the body just in front of the tail. It reaches a length of about five inches and was taken off Molokai between 43 and 73 fathoms. Only two or three specimens of this fish have ever been taken.

THE SOLE FAMILY

57 Family Soleidae (*Cynoglossidae*)

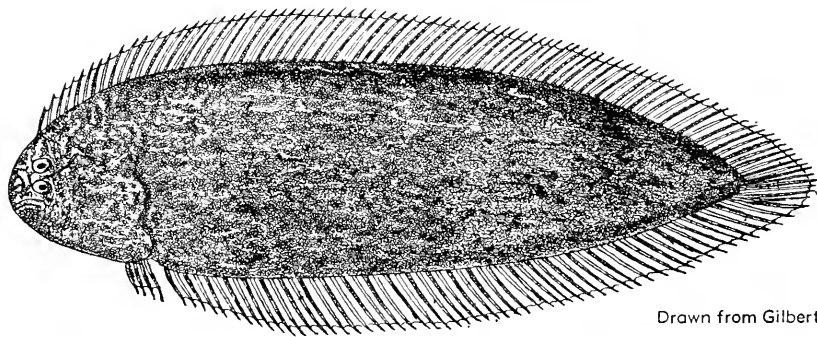
The soles are small fishes very closely related to the flounders, but much more degenerate. They have their bodies twisted so that they swim with their left side up. The upper or left side is colored and contains the eyes while the lower or right side is blind and usually whitish in color.

In general, there are three kinds of soles included in this family. They are the American or broad soles, the European soles which are more elongated, and the tongue fishes. The flounders are distinguished by a bony ridge between their eyes which the soles do not possess. The tongue fishes have eyes which are very close together and appear to have a continuous fin around the rear end of the body. Most of the species of this family are small and live on sandy bottoms. Only the larger species are used for food.

Only two tongue fishes belonging to this family are known from the Hawaiian Islands.

Rare Tongue Fish

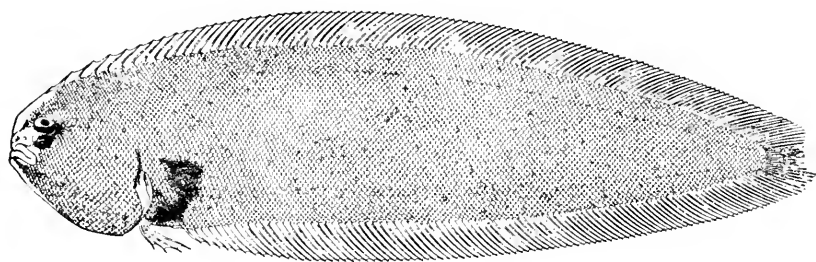
57-1 *Symphurus undatus* Gilbert



Drawn from Gilbert

This tongue fish was described as a warm brown color and as marked with light olive brown streaks which run in all directions forming a network over the upper side. It measured about four inches in length and was taken off Oahu between 154 and 195 fathoms. Only two specimens of this fish are known to scientists.

Tongue Fish

57-2 *Symphurus strictus* Gilbert

From Gilbert

This tongue fish was described as of a light olivaceous color and faintly marbled with light olive brown spots. It reaches a length of about five inches and was taken off Kauai and Oahu between 265 and 399 fathoms. Only five specimens of this fish are known; they were all taken in the Hawaiian Islands.

THE JOHN DORY OR TONGUE FISH FAMILY

58 Family Zeidae

The John Dory or tongue fishes are fishes of very unusual appearance. Their body is short and deep and much compressed and elevated. They undergo great change during the course of their development from young to adult. They inhabit all of the warm seas of the world at considerable depths.

About fifteen species are known, three of which occur in the Hawaiian Islands.

John Dory Fish

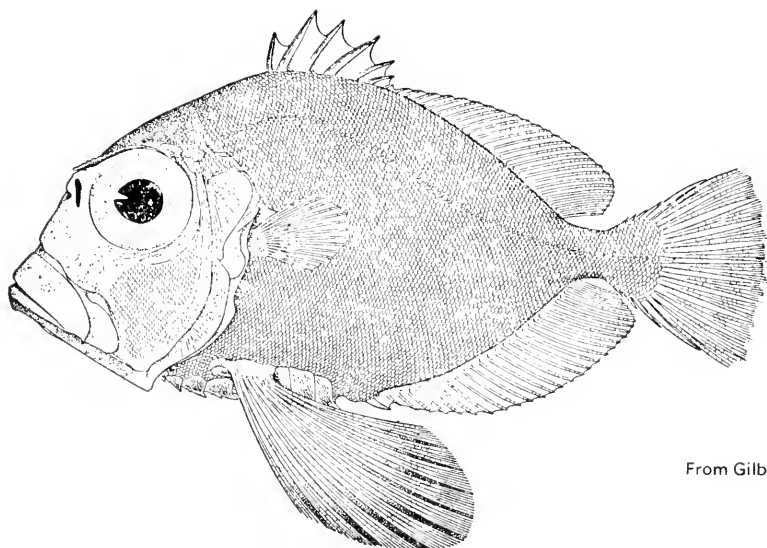
58-1 *Zenopsis nebulosus* (Schlegel)

This John Dory fish is generally a dull brown color and is marked with dusky blotches on the middle of each side. It reaches a length of about thirty inches. It is found in both Japan and in the Hawaiian Islands. It is not a common species in Hawaii.

John Dory Fish

58-2 *Stethopristes eos* Gilbert

This John Dory fish is described as being of a silvery color and overlaid with a light rose color. It measured about six inches in length

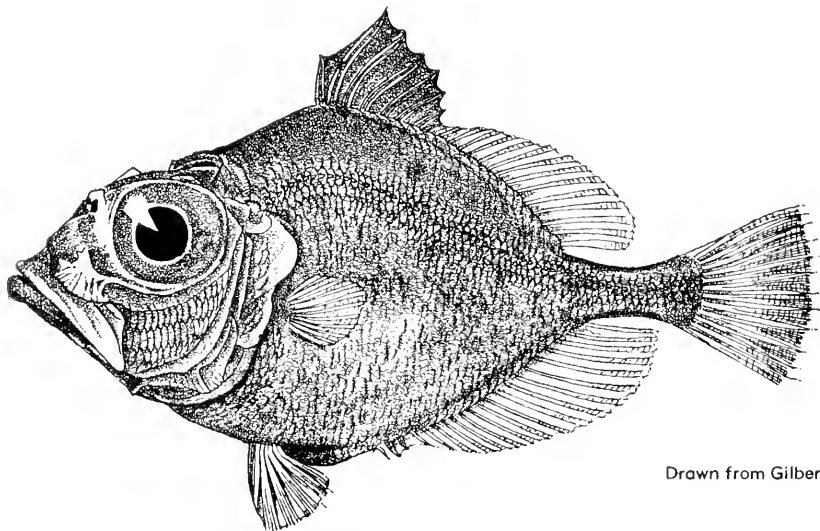


From Gilbert

and was taken in Pailolo Channel between Molokai and Maui. It is known only from the Hawaiian Islands.

John Dory Fish

58-3 *Cytomimus stelgis* Gilbert



Drawn from Gilbert

Plate IV



1. Sea Bass
2. Japanese Bass
3. Ulaula
4. Ulaula
5. Moana
6. Ukiki

7. Goatfish
8. Pilikoa
9. Aweoweo
10. Pilikoa
11. Oopu Poopaa

This John Dory fish is grayish silvery in color above and measures about four inches in length. It was taken off Barber's Point, Oahu between 192 and 352 fathoms. It is known only from the Hawaiian Islands.

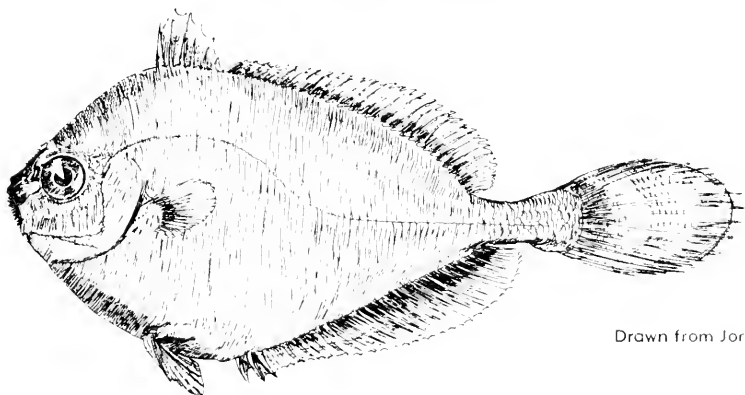
THE GRAMMICOLEPID FAMILY

59 Family *Grammicolepidae*

This family is based on one species taken off the coast of Cuba. It is a rare fish and had rough, ridged, parchment-like scales.

Grammicolepid

59-1 *Grammicolepis brachiusculus* Poey



Drawn from Jordan

This fish has been recorded once each from two widely separated places, Cuba and Hawaii. The Hawaiian specimen was taken off the coast of Hawaii at the time of a lava flow and measured about one foot in length.

THE MELAMPHAID FISH FAMILY

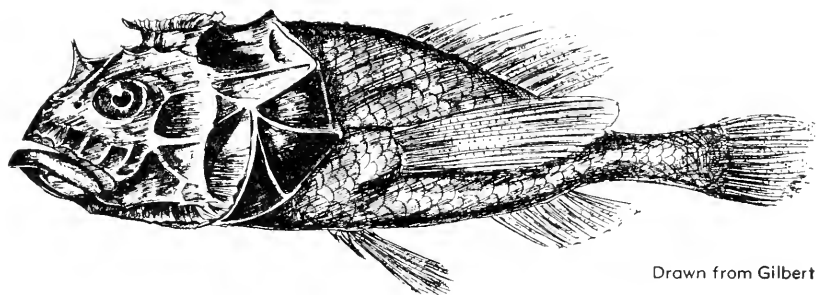
60 Family *Melampoidae*

This family includes only a few species of deep sea fishes. Two species of this group have been recorded from the Hawaiian Islands.

Unicorn Melamphaid

60-1 *Melamphoes unicornis* Gilbert

This deep sea fish is a jet black color on the head and grayish or brownish on the trunk. It has a short median spine on the snout and measures about one and one-half inches in length. This fish which was

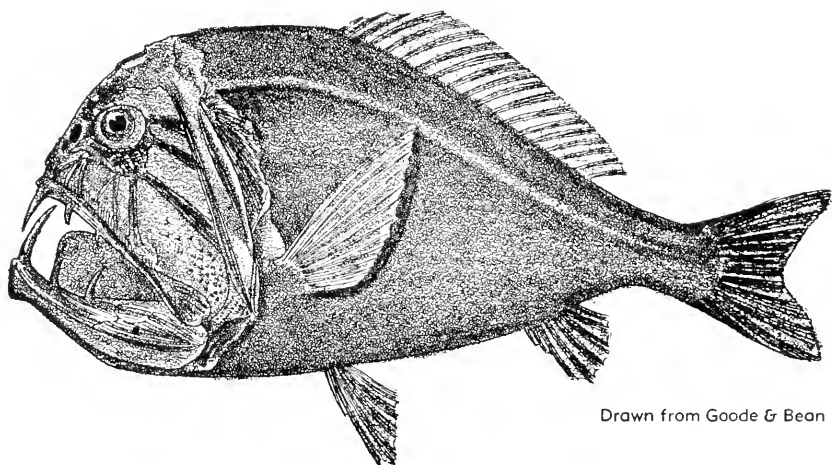


Drawn from Gilbert

taken off Kauai between 480 and 881 fathoms is known only from the Hawaiian Islands.

Melamphaid Fish

60-2 *Caulolepis longidens* Gill



Drawn from Goode & Bean

This deep sea fish is a uniform black color and measured about five inches in length. It has leaf-like scales and two pairs of long teeth in its jaws. The Hawaiian specimens were taken off Bird Island (Nihoa) between 1,164 and 1,594 fathoms.

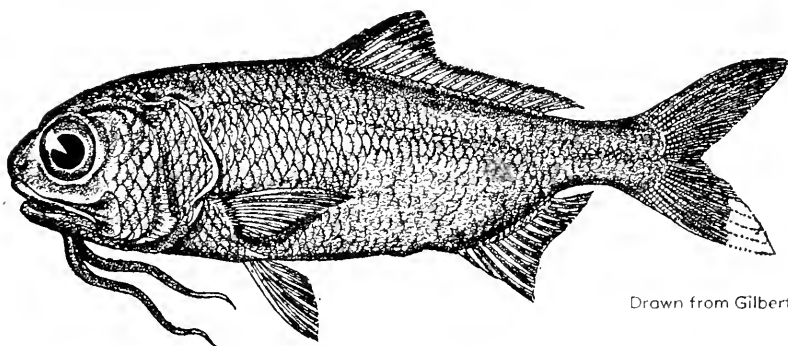
This fish seems to be widely distributed in the depths of the ocean. It has been recorded from both the Atlantic and Pacific Oceans.

THE BARBUDO OR THREAD-FIN FAMILY

61 Family *Polymixiidae*

The thread-fin family includes but one genus and probably only a single species (several have been described) which inhabits the deep waters of the Atlantic and Pacific Oceans.

Japanese Thread-Fin Fish

61-1 *Polymixia japonica* Gunther

Drawn from Gilbert

The thread-fin fish is of a uniform olive brown color above and is pale or light brown beneath. It contains two barbels on the lower jaw and measures about fifteen inches in length. The Hawaiian specimens were taken off Oahu between 195 and 241 fathoms. This fish is also known from Japan.

THE BERYCOID OR NANNYGAI FISH FAMILY

62 Family *Berycidae*

The fishes of this family are generally colored red or black and have rather compressed and short bodies. They are mostly fishes of the deep sea. Only one species is known from the Hawaiian Islands.

Berycoid Fish

62-1 *Beryx decadactylus* Cuvier

This berycoid fish is a bright rose red color and measures about two feet in length. It is recorded from both Japan and the Hawaiian Islands. It is not a common fish in Hawaii.

THE SQUIRREL OR SOLDIER FISH FAMILY

63 Family Holocentridae

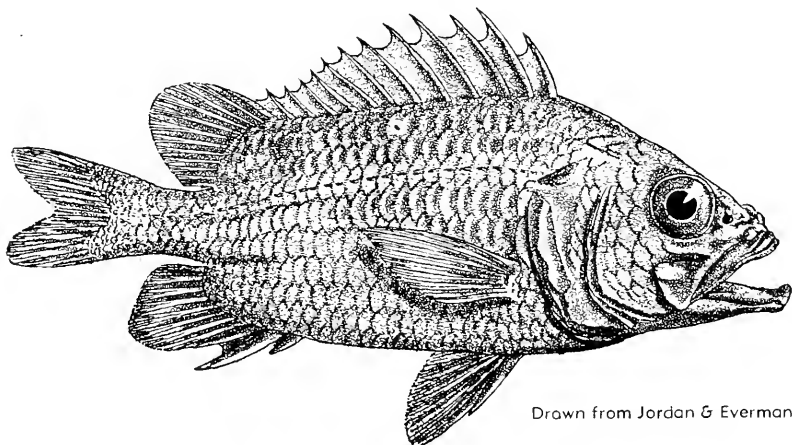
The soldier fishes are easily recognized by their red color and by the fact that their eyes are usually very large and are placed on the sides of their head. The scales of these fishes are large and rough and the bones of the head are very spiny. In addition, to their red color their bodies are usually marked with lines or stripes.

The soldier fishes live near rocky banks in tropical seas and are abundant about coral reefs. They have a firm flesh and are a good food fish, although they are not numerous enough to reach the market in large numbers.

The members of this family are known by a variety of names. They are called soldier fish, squirrel fish, Welshmen, soldados, matajuelos, malau, ala-ihī, etc.

Of more than seventy known species, at least eighteen are known from Hawaiian waters.

Japanese Squirrel Fish

63-1 *Ostichthys japonicus* (Cuvier)

Drawn from Jordan & Evermann

The Japanese squirrel fish is rosy colored in life, reaches a length of twelve inches, and has very rough scales. It is found from Mauritius eastward to Japan and the Hawaiian Islands. It is an uncommon fish in Hawaiian waters.

Squirrel Fish

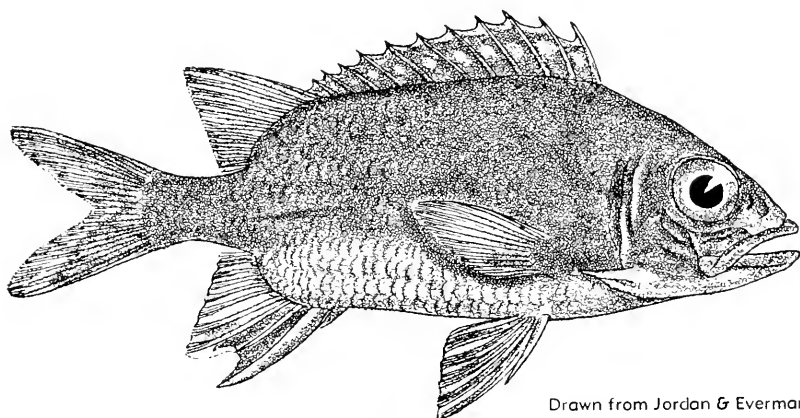
63-2 *Holocentrus binotatus* Quoy & Gaimard

This squirrel fish is of a yellowish silvery-white color with about twelve reddish longitudinal stripes. It has a brownish blotch on the first part of the dorsal fin and measures about five inches in length.

This fish is found from New Guinea and Guam to Samoa. It is thought to occur in the Hawaiian Islands.

Red Squirrel Fish

63-3 *Holocentrus erythraeus* Gunther



Drawn from Jordan & Evermann

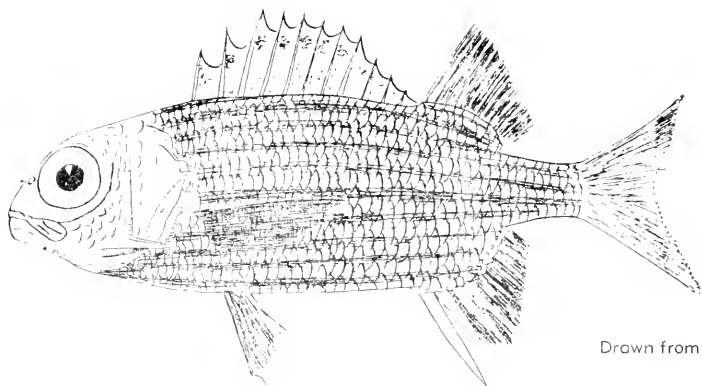
This soldier fish is very deep red in color. It is golden in color below and is marked with bright vivid violet shades. The first dorsal fin is edged with white and is marked with white on each membrane. The fins themselves are a deep red color. This fish is a handsome species and reaches a length of about one foot.

This fish is widely distributed and is found from the islands of the East Indies eastward through the islands of the south Pacific, and northward to the Hawaiian Archipelago.

Squirrel Fish

63-4 *Holocentrus lacteo guttatus* Cuvier

This squirrel fish is a bright rosy-red color with a silvery gleam above and is marked with alternating deeper and lighter stripes. The lower side is plain white. Although this fish is small, it will reach a length of about eleven inches.



Drawn from Fowler

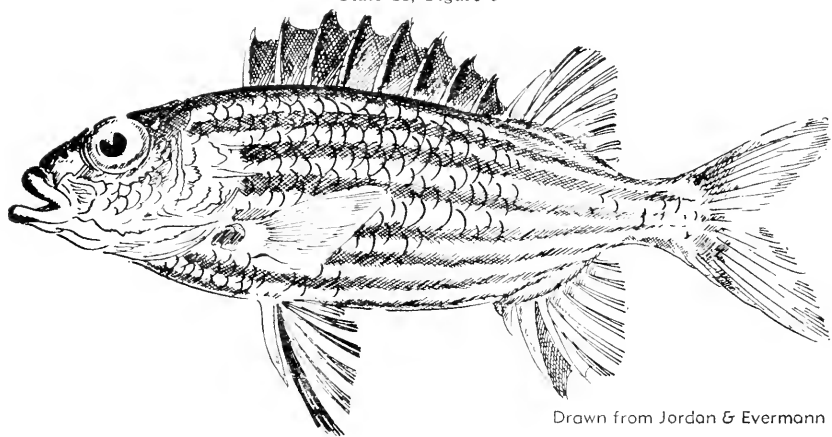
This fish is widely distributed. It is found from the Red Sea eastward through the Indian Ocean, the East Indies, and the islands of the Pacific Ocean as far as the Society Islands and the Hawaiian Islands.

Alaihi

Also known as the Alaihi Maoli

63-5 *Holocentrus xantherythrus* Jordan & Evermann

Plate II, Figure 3



Drawn from Jordan & Evermann

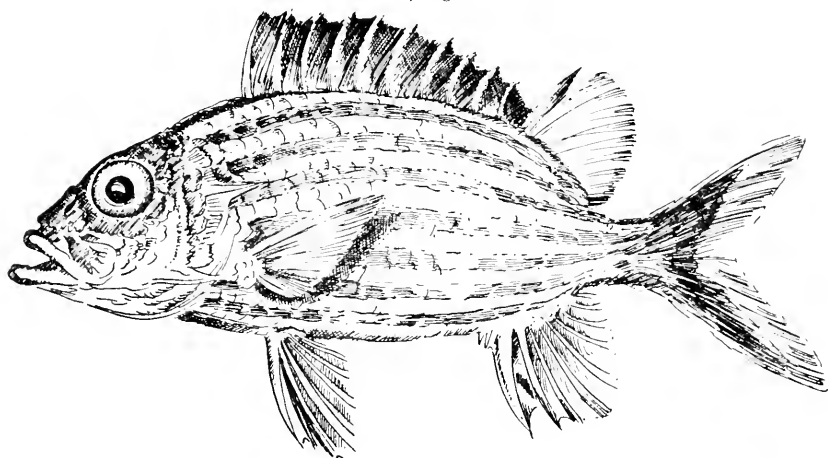
The alaihi is bright red in color above and silvery beneath. It is marked with about ten longitudinal silvery stripes with red areas between them. It reaches a length of about six inches.

This fish is found in both Samoa and the Hawaiian Islands and possibly elsewhere. It is one of the most abundant members of this family in Hawaiian waters.

Squirrel Fish

63-6 *Holocentrus furcatus* Gunther

Plate II, Figure 6



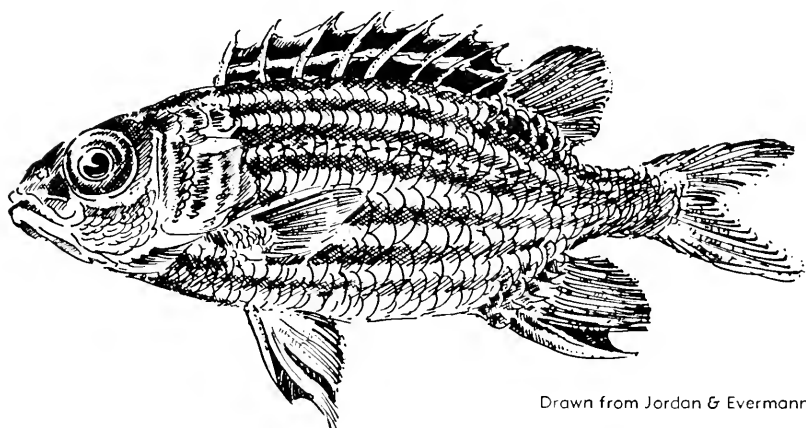
Drawn from Jordan & Evermann

This squirrel fish is a bright red color in life and is marked on the sides with eight yellow longitudinal bands. It is white in color beneath and will reach about ten inches in length. It is distributed through the islands of the South Seas and extends as far north as the Hawaiian Islands.

Alaihi Kahaloa

63-7 *Holocentrus diadema* Lacepede

Plate II, Figure 4



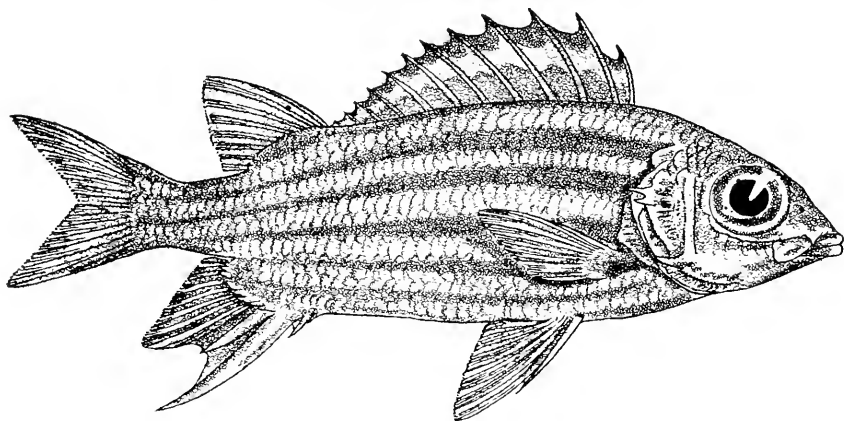
Drawn from Jordan & Evermann

The sides and back of this fish are of deep rosy or dark red color, and the body is marked with eleven distinct longitudinal white lines along the side of the body. This fish is a small species and reaches a length of about seven inches.

This fish is distributed through all of the warm waters from the Red Sea to Tahiti and the Hawaiian Islands. It is very common along the shores of Hawaii and Samoa.

Small Mouth Squirrel Fish

63-8 *Holocentrus microstomus* Gunther



Drawn from Jordan & Evermann

This squirrel fish is reddish in life and is marked with nine or ten narrow longitudinal lines. It will reach a length of eight inches.

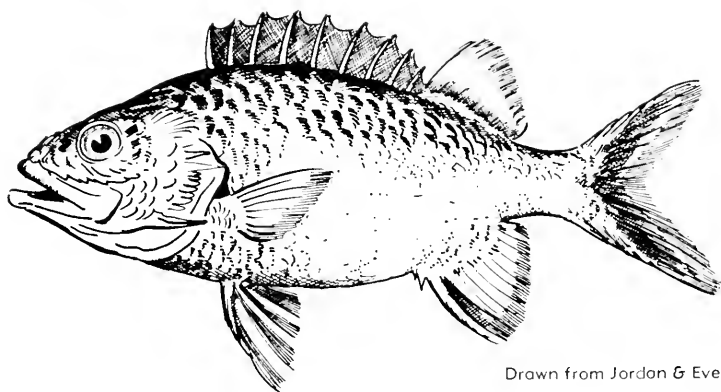
It is found from Guam, Wake, and the Hawaiian Islands southward through the warm waters of the Pacific and Indian Oceans. It is a common species in Samoa.

Alaihi or Uu

63-9 *Holocentrus spinifer* (Forsk.)

Plate 11, Figure 2

This fish is red and violet in color, is tinged with rose on its back, and is marked with longitudinal red and gold reflected stripes. It reaches a length of fifteen inches and is found from the Red Sea eastward through all of the waters of the Indian and South Pacific Oceans as far as Tahiti and the Hawaiian Islands.

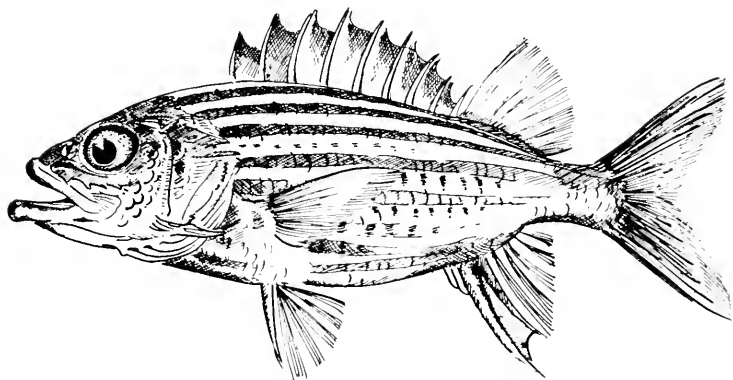


Drawn from Jordan & Evermann

Squirrel Fish

63-10 *Holocentrus scythrops* (Jordan & Evermann)

Plate II, Figure 5



Drawn from Jordan & Evermann

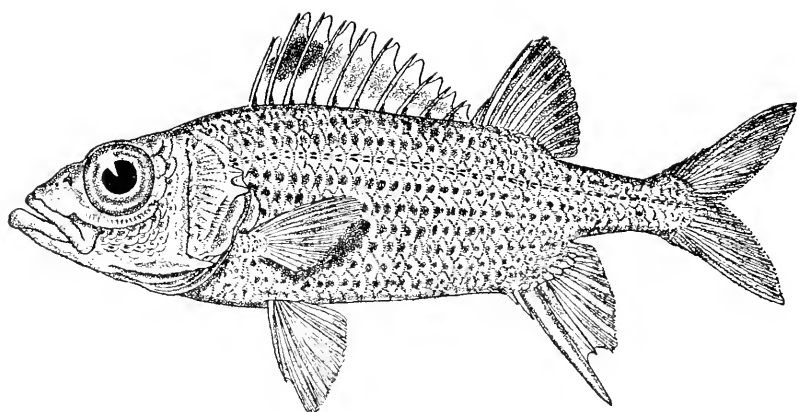
The head and body of this fish are red above, paler on the sides, and whitish beneath. The sides of the body are marked with ten to twelve narrow, yellow stripes. It reaches a length of about ten inches.

This fish occurs in the Hawaiian Islands and is commonly sold on Honolulu markets.

Squirrel Fish

63-11 *Holocentrus sammara* (Forsk.)

The body of this fish is a dull crimson brown or maroon on the head and back. The sides of the body are silvery in color and the scales have



Drawn from Jordan & Evermann

dots upon them which form longitudinal stripes. The front of the dorsal fin is marked with a large red blotch. The fish will reach a length of eleven inches.

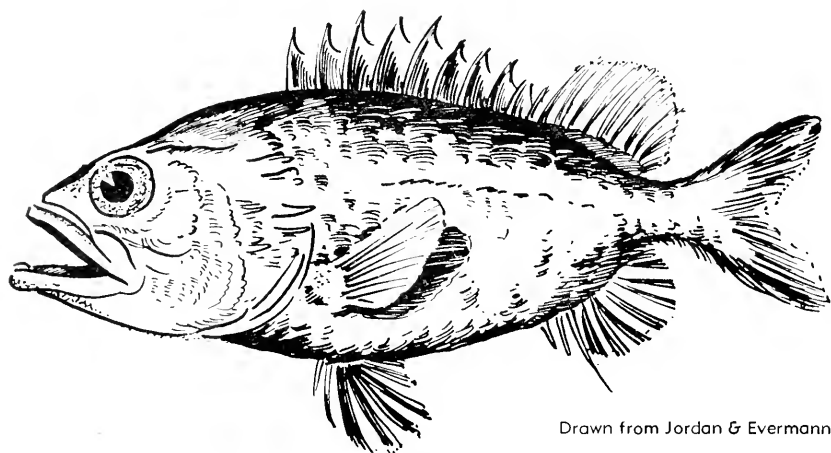
This species is found throughout the Indo-Pacific area. It is a fairly common species and is sold in the markets as food.

Squirrel Fish

63-12 *Holotrachys lima* (Valenciennes)

Plate II, Figure 8

This fish is red in color over its entire body. The upper surface is bright red in color, the sides are paler, and the under surface is a rosy white. The fish reaches a length of nearly eight inches.



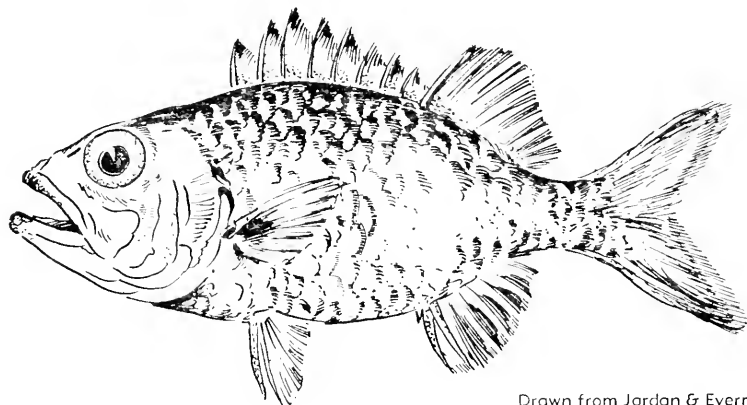
Drawn from Jordan & Evermann

This fish is found from Mauretius eastward through all of the warm tropical waters to Tahiti and the Hawaiian Islands.

Uu or Pauu

63-13 *Myripristis murdjan* (Forsk.)

Plate II, Figure 7



Drawn from Jordan & Evermann

This squirrel fish is red over its entire body, but it becomes lighter on its sides and belly. Each scale is marked with a whitish area in its center. The body of this fish will reach a length of twelve inches.

This fish is a common species in Hawaii. It is used as food and is sold on the markets in some quantity.

Uu are sometimes caught in an interesting manner. An individual "uu" fish is put on a hook and lowered into the rocky places in which they live. Because its fins are spread, it arouses the antagonism of its relatives and they swarm to attack it. They are then pulled up in a net and the process is repeated.

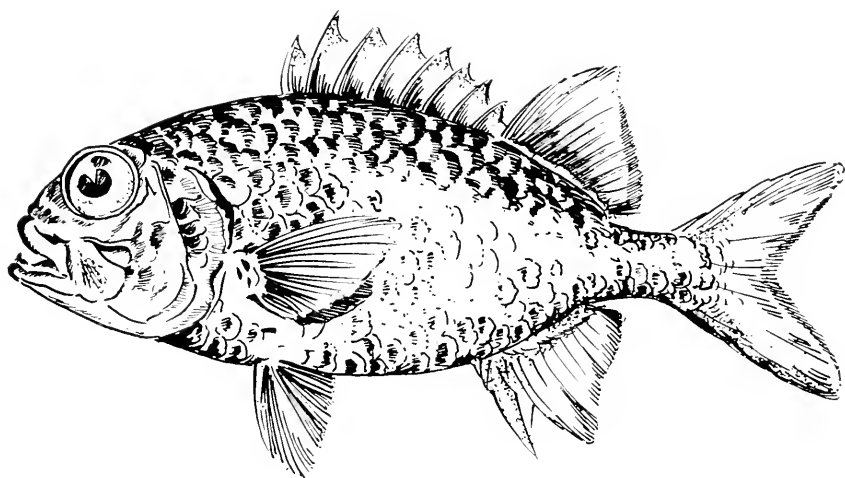
This species of uu inhabits all of the warm tropical waters from the Red Sea eastward through the Indian Ocean, the East Indies, and Polynesia as far as the Hawaiian Islands.

Pauu

63-14 *Myripristis chryseres* Jordan & Evermann

Plate II, Figure 1

The body of this fish is crimson or scarlet in color and is marked by paler spots on the centers of the fins. The fins are mostly yellow in color with touches of red. It reaches a length of ten inches. This fish

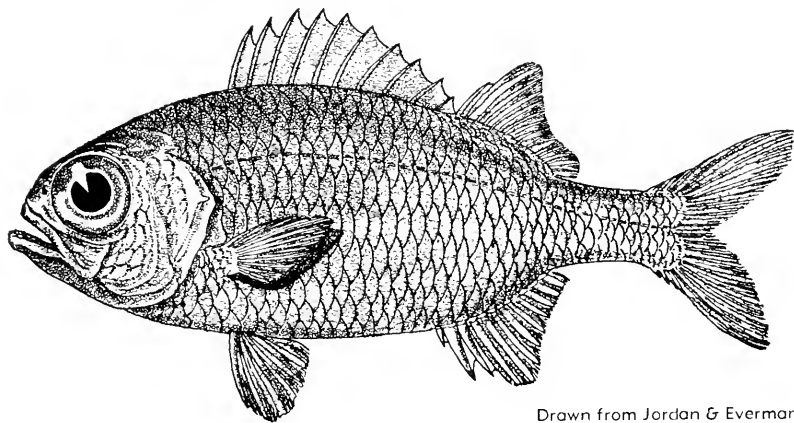


Drawn from Jordan & Evermann

is known only from the Hawaiian Islands, although it is undoubtedly much more widely distributed.

Rare Squirrel Fish

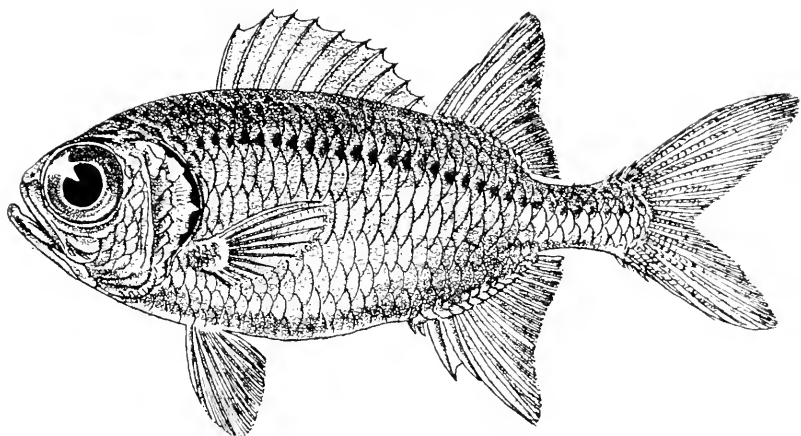
63-15 *Myripristis argyromus* Jordan & Evermann



Drawn from Jordan & Evermann

This rare squirrel fish is a reddish color in life and measures about nine inches in length. It is a rare and uncommon fish and is known only from the Hawaiian Islands.

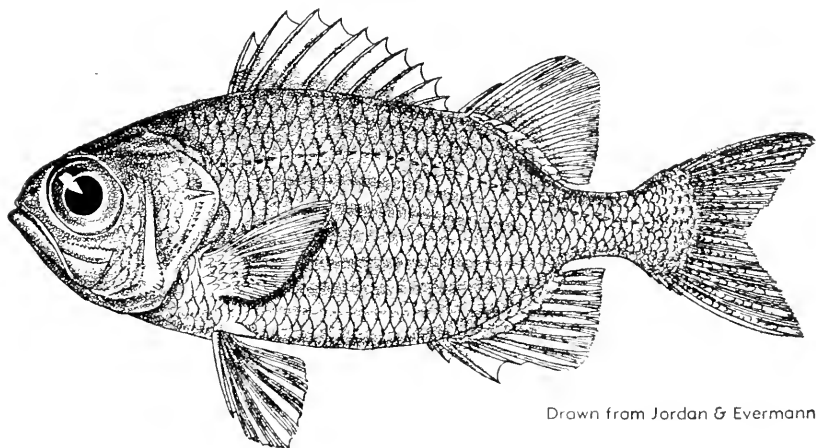
Uu

63-16 *Myripristis pralinus* Cuvier

Drawn from Jordan & Evermann

This squirrel fish is a reddish color and is marked with a black stripe on its opercle. It will reach a length of about eight inches. This fish is an Indo-Malay and Pacific Ocean species and is distributed through all of the warm tropical waters from New Guinea to Easter Island and from Samoa to the Leeward Islands of the Hawaiian Archipelago. It is not a common fish in Hawaiian waters.

Seale's Squirrel Fish or Uu

63-17 *Myripristis sealei* Jenkins

Drawn from Jordan & Evermann

This rare squirrel fish is reddish color in life and reaches a length of about six inches. It is an uncommon fish and is known only from the Hawaiian Islands.

THE PIPE FISH AND SEA HORSE FAMILY

64 Family Syngnathidae (Hippocampidae)

This family includes both the sea horses and the pipe fishes. The pipe fishes include the straight individuals, while the sea horses have a prehensile tail and a turn in the neck which gives them their horse-like appearance.

The bodies of these fishes are long and slender and are covered with bony rings and plates which are firmly connected together. The heads of these fishes are usually long and slender and have a tube-like snout at the end of which is placed a pair of short toothless jaws. The members of this family range in length from two to twelve inches.

These fishes have a very curious matrimonial arrangement. The male fish contains an egg pouch on its abdomen composed of two folds of skin. Into this pouch the female places the eggs which she has laid. The eggs remain in this pouch until they hatch, then the pouch opens and the young escape to begin life for themselves.

The sea horses spend their life crawling over seaweed looking for the tiny creatures on which they feed. They eat diatoms, small crustacea, and other creatures living among the seaweeds. They are poor swimmers, but are widely distributed by ocean currents. They inhabit all warm seas and sometimes enter fresh water.

Of more than 150 known species, at least seven are known from the Hawaiian Islands.

Pipe Fish

64-1 *Syngnathoides biaculeatus* (Bloch)

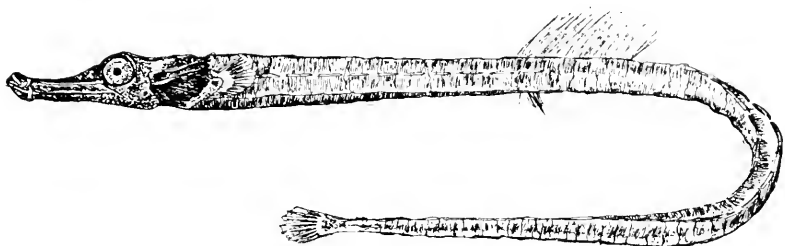
This pipe fish is full brown in color and reaches a length of nearly twelve inches. It has been recorded from the East Indies, New Guinea, New Caledonia, Samoa, Guam, and from the Hawaiian Islands.

Pipe Fish

64-2 *Dorybampus melanopleura* (Bleeker)

This pipe fish reaches a length of about three inches and is found from the Island of Mauretius through the East Indies to Samoa, Japan, and the Hawaiian Islands.

Rare Pipe Fish

64-3 *Ichthyocampus erythraeus* Gilbert

Drawn from Gilbert

This pipe fish is known from a single specimen taken with a tangle off the south coast of Molokai at a depth between twenty-three and twenty-four fathoms. It was a brick red color in life and measured about two inches in length.

Edmondson's Pipefish

64-4 *Ichthyocampus edmondsoni* Pietschmann

Drawn from Pietschmann

This pipe fish is known from a single specimen caught off Waikiki, Oahu by Dr. Charles Howard Edmondson, formerly Director of the Marine Biological Laboratory of the University of Hawaii. It had a very long and slender body and was marked with brown and white bands. It measured about four inches in length.

Ball's Pipefish

64-5 *Micrognathus balli* (Fowler)

Drawn from Fowler

This pipe fish was named for Stanley C. Ball. It measured about two inches in length and was taken at Waikiki, Oahu.

Sea Horse

64-6 *Hippocampus bistris* Kaup

This sea horse reaches a length of six inches and is found from the Red Sea eastward through the East Indies, to Tahiti, Japan, and the Hawaiian Islands.

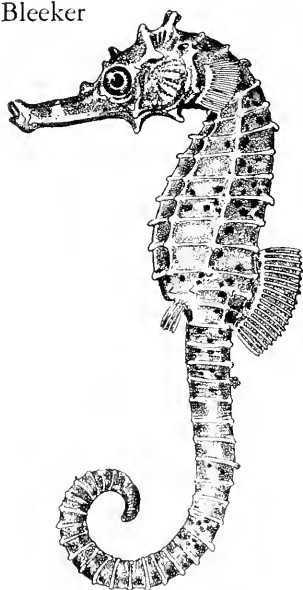
Sea Horse

64-7 *Hippocampus kuda* Bleeker

This sea horse varies in color from a blackish brown with an orange background to a golden yellow on the lower trunk. Although most of the sea horses measure about three inches in length, they may reach a length of about nine inches. The tail of this species is no longer than the head and trunk. This fish is often found in the stomachs of larger fishes.

This species is distributed throughout the Indo-Pacific area including Japan and the Hawaiian Islands.

Drawn from Jordan & Evermann



THE SEA MOTH FAMILY

65 *Family Pegasidae*

This family includes the sea moths and the sea dragons. They all have a long snout and a toothless mouth beneath and rarely exceed four inches in length. Their bodies are covered with bony plates and the dorsal and anal fins are very short. The pectoral fins are large and well developed. Fish experts thought that they resembled Pegasus, the winged horse of Greek mythology and named the family for this flying horse.

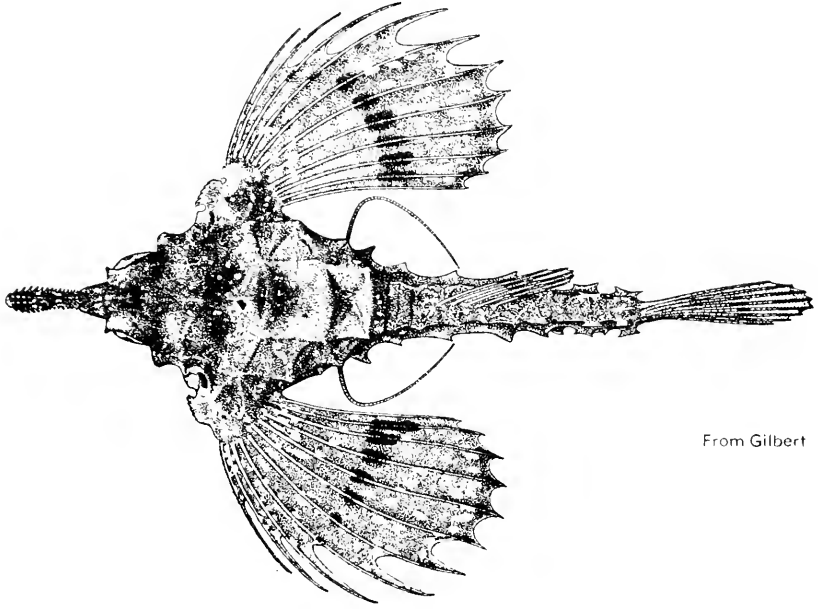
Only one species is known from Hawaiian waters.

Hawaiian Sea Moth

65-1 *Pegasis papilio* Gilbert

This sea moth is olive, pale brown, or yellowish olive above and is spotted with white and red. It is whitish in color beneath. This species

measures about three inches in length and was taken between 24 and 83 fathoms. It is known only from the Hawaiian Islands.



From Gilbert

THE TRUMPET FISH FAMILY

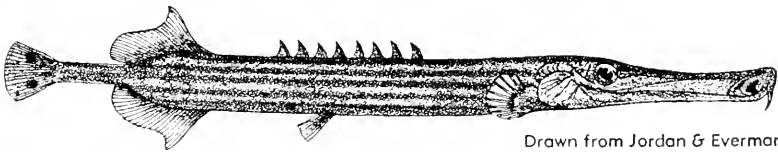
66 Family *Aulostomidae*

The trumpet fishes have long, compressed, band-shaped, scaly bodies and elongated heads containing a pair of feeble jaws at the end. The entire family includes one genus and only one or two species. They are widely distributed in tropical seas.

One member of this family is found in the Hawaiian Islands.

Nunu or Trumpet Fish

66-1 *Aulostomus chinensis* (Linne)



Drawn from Jordan & Evermann

These fishes vary in color from yellow to a chocolate brown. The lighter colored forms are striped with five or six longitudinal stripes and

some of the individuals have two vertical rows of light spots near the end of the trunk and one or two black spots on the tail. They reach a length of two feet and are quite common in the Hawaiian Islands.

This fish is widely distributed in the Indo-Pacific area and is found in the Leeward Islands of the Hawaiian Archipelago.

THE CORNET OR FLUTE MOUTH FISH FAMILY

67 *Family Fistulariidae*

The cornet fishes have very long, slender, flat bodies and a long tube-like snout ending in a pair of toothless jaws. Their bodies are without scales, but they have bony plates on the body in their stead. They are all dull red or dull green in color and reach a length of about three feet. They live in warm tropical seas and swim in shallow water near the surface. The family is related to the sticklebacks. They include one genus and four or five species, two of which are known from the Hawaiian Islands.

Cornet Fish or Nunu Peke

67-1 *Fistularia petimba* Lacepede

This fish is a greenish, brownish or reddish color in life, whitish beneath, and is marked by indistinct cross bars. Large specimens will reach a length of over three feet. This fish is caught by birds and carried ashore to be eaten. It is commonly sold in commercial fish markets.

This cornet fish is very widely distributed and is recorded from nearly all warm seas. It is found in all of the waters from the Philippines, Guam, and Hawaii southward to Tahiti and the New Hebrides.

Cornet Fish

67-2 *Fistularia villosa* Klunzinger

This cornet fish is found from the Red Sea eastward through all of the islands of Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

THE SHRIMP FISH FAMILY

68 *Family Centriscidae (Amphisilidae)*

The members of the shrimp fish family are all covered by a long, translucent, bony plate. The snout is long and has a toothless mouth at the end. The family is an East Indian group and is named shrimp fishes because its members are transparent like shrimps.

Only one species in this family is known from the Hawaiian Islands.

Striped Shrimp Fish

68-1 *Centriscus strigatus* (Günther)

This shrimp fish is marked by a blackish lateral band and measures about six inches in length. It is found from the Persian Gulf to the East Indies, the Solomon Islands, Japan, and the Hawaiian Islands.

THE SNIPEFISH FAMILY

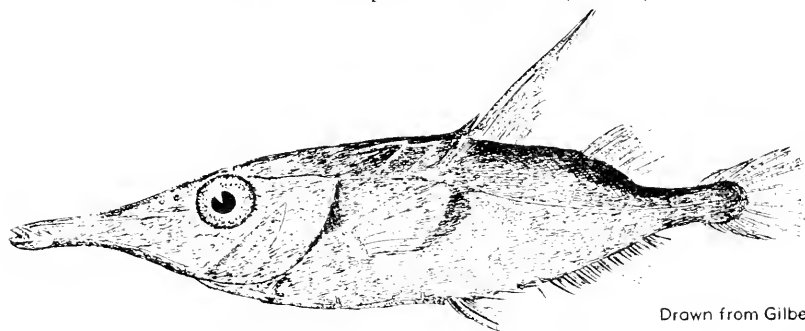
69 Family *Macrorhamphosidae*

The family of the snipe fishes has heads which are elongated into a tube-like snout. The body is short, deep, and compressed.

One member of this family is known from the Hawaiian Islands.

Snipefish

69-1 *Macrorhamphosus velitaris* (Pallas)



Drawn from Gilbert

This snipe fish is of a dark slate color on the back and on the top of the head; the remainder of the body is of a bright silvery color. It reaches a length of about two feet.

This snipe fish is found in the Mediterranean Sea and from the east coast of Africa westward through all of the warm waters to the coast of California. It has been taken in the Hawaiian Islands between 59 and 70 fathoms.

THE SNAKE HEAD MULLET OR CHINA FISH FAMILY

70 Family *Ophicephalidae*

This family of fishes has long cylindrical bodies and carnivorous and voracious habits. They are extremely tenacious of life and are native to Southern China, India, Formosa, and Africa.

One species has been introduced into the Hawaiian Islands from Asia.

China Fish, Leopard Fish, or Chinese Catfish

70-1 *Ophicephalus striatus* Bloch

The China fish is blackish-brown above and is marbled with white on its upper surface. The sides are marked with longitudinal gray lines and the lower surface is of a dirty white color. The fish will reach a length of two feet.

Native to the lowlands of southern China, Malaya, and India, it was introduced into Hawaii about 1900. Jordan states that it was "doubtless introduced from Borneo," but it is much more likely that it came directly from China. It is the most widely distributed species of the family.

In its native home the China fish lives in grassy swamps, but in Hawaii it lives in the muddy bottoms of taro patches, streams, and ditches. It has a tenacious hold on life and will live in the mud when the ponds are dry. It will bite at almost any bait within reach.

THE SILVERSIDE OR FRIAR FISH FAMILY

Also known as Hardy Heads, Pescados del Rey, Peixerey,

Fishes of the King, Joel, Sauclet, Brit, and erroneously called Smelt or Blue Smelt in California.

71 Family *Atherinidae*

The silversides are small, elongated fishes of a translucent, green color and are usually marked with a broad band of silver which is often underlaid with black pigment. The tropical species range from two to six inches in length, although in the temperate regions of the New World some species reach a length of one or two feet.

They are carnivorous fishes in their habits and, because of their small mouths and feeble teeth, are obliged to feed on small animals. They live in great schools near the shore in tropical and temperate seas and a few species are found in fresh water. They are surface and shore fishes and do not invade deeper waters. The larger species are highly valued as food, but the small species are too small for good eating. Their flesh is dry and delicate in taste.

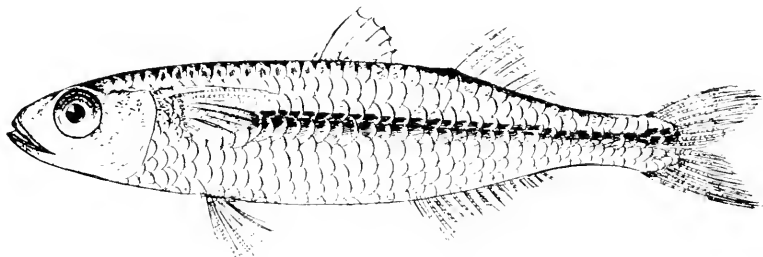
Of more than 150 known species, most of which are European, only one species is known from the Hawaiian Islands.

Iao or Hawaiian Silverside

71-1 *Hepsetia insularum* (Jordan & Evermann)

The Hawaiian silverside is of a clear olive-green color with darker edged scales. The lateral stripe is steel blue above and gradually fades

into the belly which is silvery in color. The fins are uncolored. This species reaches a length of from one and one-half to three and one-half inches. Specimens four inches in length are about nine years old.



Drawn from Jordan & Evermann

This fish is known only from the Hawaiian Islands. It is commonly seen in schools about Pearl Harbor and on the inside of reefs and shallow bays.

THE MULLET FAMILY

72 Family *Mugilidae*

The mullets are fairly stout fishes with blunt heads and large scales. They are bluish silvery in color and measure from one to two feet in length.

Because the mullets feed on organic matter in mud, they have an unusual digestive apparatus. The teeth are feeble and the mouth which is small leads into a filter like apparatus in the pharynx. This filter is modified from the organs of the pharynx to keep the dirt out of the gills. Mud and sand are taken into the mouth and there separated. The indigestible elements are spit out and the rest is swallowed into a muscular, gizzard-like stomach somewhat like that of chickens.

Of more than 100 species inhabiting the fresh and coastal waters of warm regions, only three are known from the Hawaiian Islands.

Mullet

72-1 *Mugil trichilus* Vaillant & Sauvage

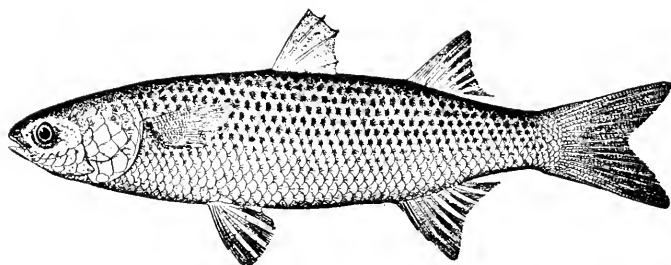
This mullet is found from India and the East Indies, through Melanesia and the Islands of the Pacific as far as the Hawaiian Islands.

Common Striped Mullet or Ama

72-2 *Mugil cephalus* Linne

Plate III, Figure 9

The mullet is bluish gray above, silvery white beneath, and is marked by dark streaks along the rows of scales. It will reach a length of two feet.



From Jordan & Evermann

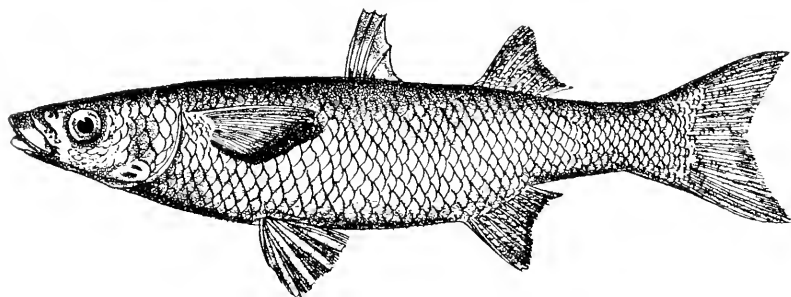
The striped mullet is found in all of the warm waters of the world. It swims in schools over muddy bottoms and is usually found in bays, lagoons, estuaries, and streams.

In Hawaii, the mullet is one of the most important food fishes. It has been reared in ponds for hundreds of years and has played an important part in Hawaiian life.

The Hawaiians gave this fish a number of names depending on its size: Pua ama-ama (young), pua ama (young), pua (young), anae (fingerling), ama-ama (eight inches), ama (large), and anae holo (light running mullet).

Mullet

Also known as the Uouoa or False Ama-ama
72-3 *Neomyxus chaptalii* (Eydoux & Souleyet)



Drawn from Jordan & Evermann

This mullet is hard to distinguish from the true mullet. Its mouth, however, is more slender and more tapering than the common striped mullet. It is silvery gray in color above and passes gradually to white on the lower surface. It will reach a length of twelve inches. Like the

common mullet it lives along the coast line and ascends rivers for a short distance.

This fish is found throughout the Indo-Pacific area and through all of the islands of Polynesia including the Hawaiian Islands.

THE BARRACUDA FAMILY

Also known as the Pike Family

73 Family *Sphyraenidae*

The barracudas are slender, somewhat compressed, pike-like fishes which reach a length of eight feet and weigh over 100 pounds. They are famous for their long, knife-like teeth and ferocious habits. Carnivorous and voracious in their habits, they live on all manner of live fish. They eat sardines, anchovies, silversides, mackerel, and their own young. They are one of the most formidable of the bony fishes and seem to fear nothing in the ocean. When they are young they travel in schools, but they become solitary when they reach a larger size.

The barracudas are valued as food because their flesh is firm, delicate, and of excellent flavor.

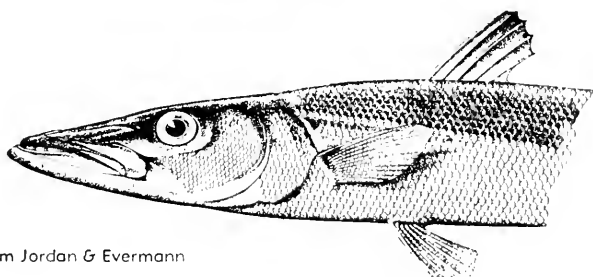
The family contains one genus and about twenty species inhabiting the warm seas of the world. Two species of this family are known from Hawaiian waters.

Great Barracuda or Kaku

Also known as the Picuda, Welea, Kawalea, and Kupala

73-1 *Sphyraena barracuda* (Walbaum)

Plate III, Figure 10



From Jordan & Evermann

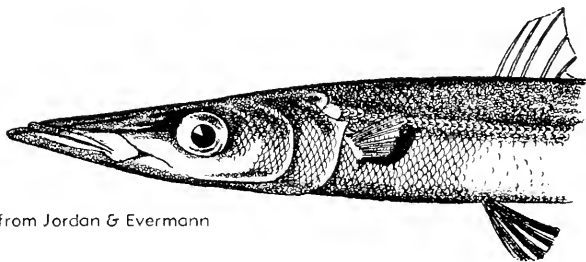
The barracuda is grayish-brown in color above and silvery on the sides and belly. Their sides are marked with spots which appear to form about twenty short blackish bars. They reach a length of six or eight feet at sea, but shoreline individuals usually average about eighteen inches

in length. Because of their voracious habits and because they frequent shorelines, they are often a source of trouble in mullet ponds.

This fish is distributed from the Red Sea eastward to Hawaii and in the West Atlantic from the West Indies to Massachusetts.

Kawalea or Japanese Barracuda

73-2 *Sphyraena japonica* Cuvier



Drawn from Jordan & Evermann

The kawalea is of a steel olive color above and is often marked with two light yellow stripes along each side which seem to fade with age. This fish is reported to reach a length of three feet.

This species was never called kaku by the Hawaiians.

This barracuda is distributed from the East Indies to Japan and the Hawaiian Islands.

THE THREAD FIN OR THREAD FISH FAMILY

74 *Family Polynemidae*

The thread fin fishes are usually bluish and silvery in color and are sometimes striped with black. They have the pectoral fin divided into two parts to form a free filament which may be as long or longer than the body.

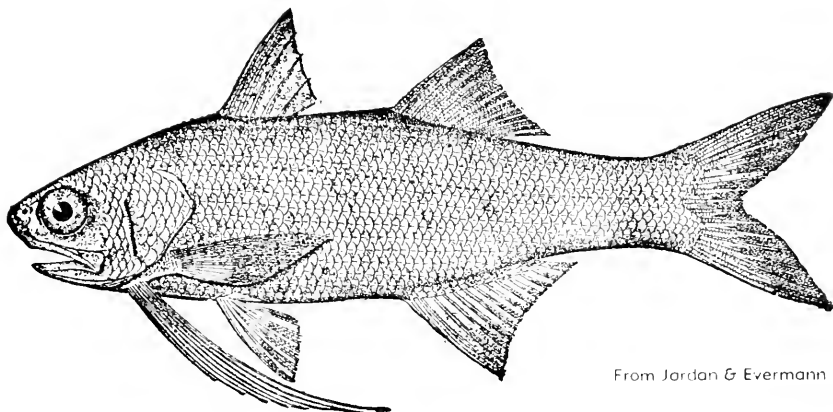
The thread fins live along sandy shores in tropical seas and sometimes enter fresh water rivers. They are carnivorous fishes although they are neither active nor voracious. Most of the members are edible and their flesh is valued as food.

The family is small and includes about 25 species, only one of which is known from the Hawaiian Islands.

Pacific Thread Fin

Also known as the Moi or Moi-ii

74-1 *Polydactylus sexfilis* (Valenciennes)



From Jordan & Evermann

The body of the Pacific Thread Fin is deep and compressed in shape. It is dark in color above and becomes almost white on the lower surface. It reaches a length of twelve inches.

This fish is reported to have been called pala-moi on Kauai and mana-moi on Hawaii.

It occurs from Mauretius through the Indian Ocean to the East Indies and to the Hawaiian Islands.

THE MACKEREL OR TUNA FAMILY

75 Family Scombridae

The members of the mackerel family may be recognized by the fact that they have slender, tapering, spindle-shaped bodies which end in a very small caudal peduncle, a series of detached finlets on the body behind the dorsal and anal fins, and a metallic color usually of steel blue. In addition, they have a keel on the peduncle, and smooth scales.

In general, the mackerels are all fish of the high seas, many of which are cosmopolitan and have a wide range. They are surface fishes and because of their strong muscles and stream lines are swift swimmers. The tuna are great wanderers and are continually swimming in search of the fishes which form their food. They feed on mackerel, herring, flying fishes, sardines, squids, and cuttlefish.

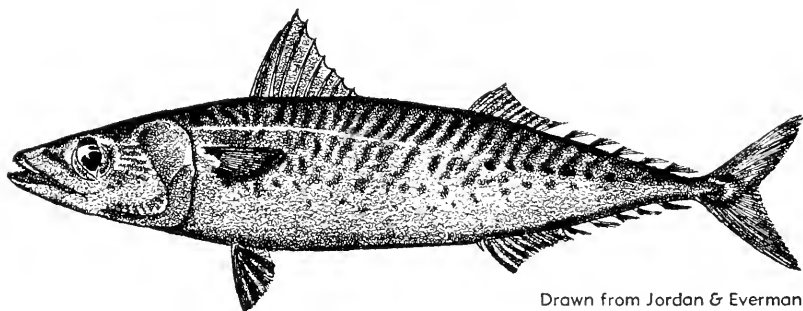
The mackerels and tunas make an important family of food fishes. They are nearly all valued as food and support fishing industries wherever they are found. They have a firm, oily flesh which is often coarse in texture.

Of more than sixty known species in the family, at least thirteen are known from Hawaiian waters.

Opelu

Also known as the Tinker Mackerel, Pacific Chub Mackerel, Opelu Palahu, Opelu Paka, Saba or Japanese Mackerel

75-1 *Scomber japonicus* Houttuyn



Drawn from Jordan & Evermann

The opelu has a somewhat longer body than most mackerels. It is bluish in color above with about thirty darker streaks or zig-zag bands along each side of the back. The lower surface is paler in color and has many inconspicuous spots scattered over the surface. The entire body has brilliant silvery and blue reflections. The jaw is without teeth. This fish measures about fifteen inches in length.

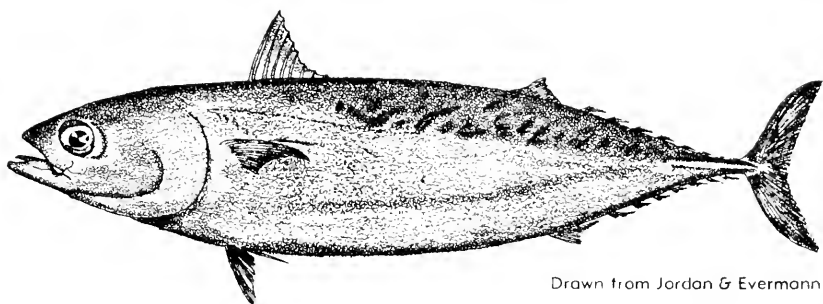
In Hawaii the opelu is a seasonal fish appearing during the summer months. In anticipation and preparation of the summer fishing, the Hawaiians made elaborate religious preparation marked with ritual, prayers, and tabus. For further accounts of these ancient practices see Fornander, Abraham—Hawaiian Antiquities and Folklore. Bernice P. Bishop Museum Memoirs 6:1, 1919, pp. 30-34.

The opelu occurs in both the Atlantic and Pacific Oceans. It is common in the Mediterranean Sea and off the coast of southern California. On the Atlantic coast it has had a sporadic history.

Frigate Mackerel or Mexican Skipjack

75-2 *Auxis thazard* (Lacepede)

The frigate mackerel is dark bluish green above and silvery beneath. The sides of the body above the lateral line and behind the corselet are



Drawn from Jordan & Evermann

marked with black spots or by more or less wavy bars. These wavy bars cover the last three-fifths of the body and run backward and upward. There are no markings below the lateral line. This fish may be recognized by the fact that the dorsal fins are far apart and by the corselet formed by scales on the front of the body. It has seven finlets above and five below. The frigate mackerel is a smaller mackerel than the skipjack and may reach a weight of ten pounds. In schools, however, it seldom exceeds five pounds in weight.

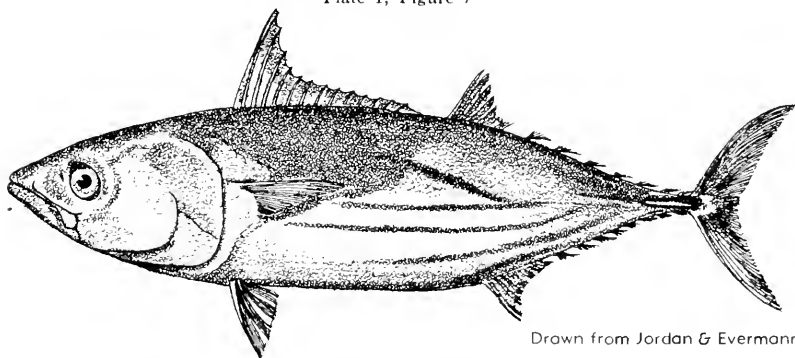
The frigate mackerel is circumtropical and inhabits all warm seas.

Ocean Bonito or Skipjack

Also known as Aku, Aku Kinau, Little Tunny, or Striped Tuna

75-3 *Euthynnus pelamis* (Linne)

Plate I, Figure 7



Drawn from Jordan & Evermann

The aku is the smallest of the tunas and usually measures less than thirty inches. It is of a bluish color above and silvery beneath. The tongue and the inside of the mouth are likewise silvery in color. The finlet number eight above and seven below. The eyes are large and are yellow in color with black centers. This fish is easily recognized by the

four longitudinal stripes below the lateral line and by the curve in the lateral line below the second dorsal fin.

The aku is a pelagic fish of very wide range. It is a surface swimmer and can make about twenty-five miles per hour. They travel in schools and take bait easily. They feed on young half-beaks, sardines, and plankton; they often jump clear of the water when feeding. Their enemies include the larger tunnies and the spearfishes.

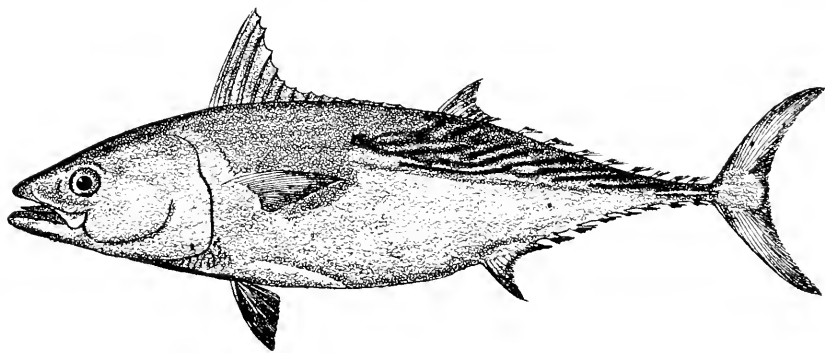
It is interesting to note that C. M. Cooke, Jr., reported "one school, several years ago, off the north coast of Oahu about 90 miles long and 10 miles broad. Individuals of similar size assembled in certain parts of the school."

The aku is circumtropical in its distribution. It is a pelagic species in all warm seas. It is common in Hawaii during the summer months.

Little Tunny or Bonito

Also known as Kawakawa or Kawakawa Kinau

75-4 *Euthynnus alletteratus* (Rafinesque)



Drawn from Jordan & Evermann

The kawakawa is dark blue in color above and almost silvery beneath. The back above the lateral line is marked with twelve dark streaks which are usually short and run upward and backward. This fish reaches a maximum length of three feet, although most individuals are about half this length.

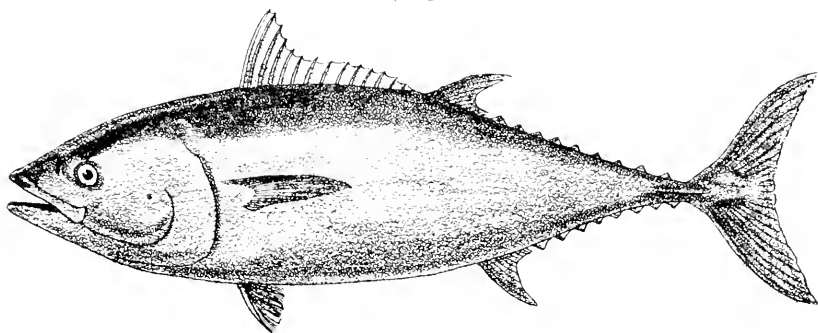
The little tunny is a circumtropical species. It is pelagic in all of the warm seas of the world. It is taken in the open sea with hooks and is common on most markets.

Blue Fin Tuna, Great Albacore, or Ahi

Also known as the Short-Finned Tunny, Common Tunny, Leaping Tuna, Tunny, Tuna, European Tunny, Atum Rabilhae (Portuguese), Atun, Great Tunny, and Horse Mackerel

75-5 *Thunnus thynnus* (Linne)

Plate I, Figure 8



The blue fin tuna is deep blue in color above, iron gray on the sides, and grayish beneath. The pectoral fins are short and reach only to about the ninth dorsal spine. The caudal fin is widely forked. The lower rear half of the body is streaked and spotted with small silvery spots, although the body is without stripes. Fine teeth line the midline of the roof of the mouth.

The blue fin is the largest of the tunas and the largest bony fish in the sea. It usually weighs about 250 pounds but it will reach a length of over ten feet and will weigh 1,500 pounds.

The blue fin usually spawns off shore in the late winter months and then returns toward the coast to feed after spawning. It feeds on live fish including flying fish, sauries, anchovies, mackerel, bonitos, squids, argonauts, etc. Its only enemy is the killer whale.

The blue fin tuna is pelagic in all of the warm seas of the world. It is common in the Mediterranean Sea and extends northward along the coast of Europe; it is also commonly taken throughout the Pacific Ocean from Japan to California.

Bonito or Black Tunny

Also known as the Oriental Tunny, Kuroshibi, or Maguro

75-6 *Thunnus orientalis* Schlegel

This tuna is a large species and very closely resembles the blue fin tuna. It seems to differ from the blue fin tuna by having a shorter second

dorsal fin and by having the finlets yellowish instead of blue. The belly of this fish is marked by twelve pale indistinct cross bars of a grayish silvery color. These stripes are narrower than the areas between them and are replaced both above and beneath by round spots. The smaller spots were also reported as alternating with the bars.

This fish is a bit puzzling to scientist and will not rest securely as a species until more is known about it.

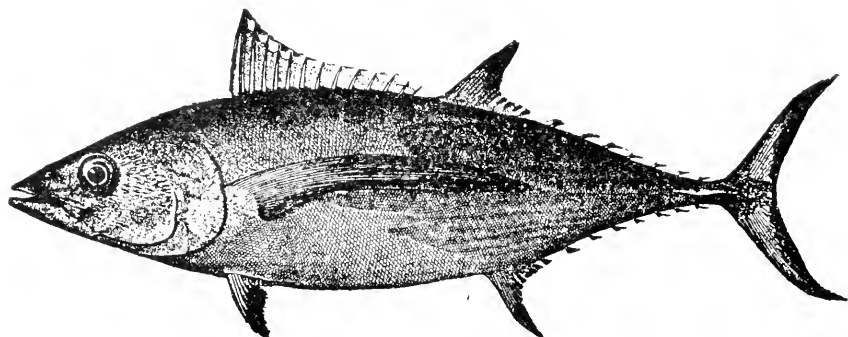
This tuna is known to inhabit the waters about Japan and the Hawaiian Islands.

Long-Finned Albacore

Also known as the Atlantic or European Albacore, Albacore, Germon, Long Finned Tunny, Alalunga, and Atum Aboodor (Portuguese)

75-7 *Germo alalunga* (Gmelin)

Plate I, Figure 6



From Jordan & Evermann

The body of this tuna is bluish in color above and silvery beneath. The sides below the lateral line are marked with rather indistinct, pale, longitudinal streaks. Although it resembles the blue fin tuna, it may be distinguished by the pectoral fins which are very long and which make up over one-third the length of the body. The finlets are all dark and are without yellow coloring. One of the smallest of the tunas, it usually weighs about fifteen or twenty pounds, but it may weigh as much as eighty pounds.

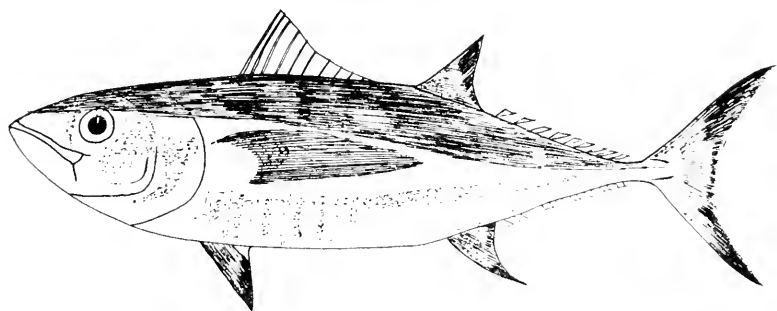
Barnhart reports that "this is the fish that made possible the growth of the tuna-packing industry. Originally it was the only fish used for canning, and it was not until the demand was greater than the supply that attention was turned to other tunas."

The long-finned albacore is a circumtropical species. It is a pelagic species and is widely distributed in all tropical seas. In the Atlantic Ocean it is found from England to southern Africa and from the West Indies to Massachusetts. It is a very common species in the warmer waters of the Pacific Ocean. It occurs from Japan eastward through Hawaiian waters to the coast of lower California.

Tuna or Long Finned Albacore

Also known as Shibi, Mebachi (Wasp Eye), and Daruma Shibi

75-8 *Parathunnus sibi* (Schlegel)



Drawn from Fowler

This tuna is blue on the back and silvery white beneath. The pectoral fins are long and falcate, the upper finlets are yellow with dark edges and white points, while the lower finlets are pale and without yellow markings. It may be distinguished by its unusually large eye and plump body. This fish is found from Japan to the Hawaiian Islands and elsewhere in the Pacific Ocean. It is fairly common in fish markets.

Yellow-Fin Tuna

Also known as the Yellow-Fin Albacore, Pacific Albacore, Ahi,

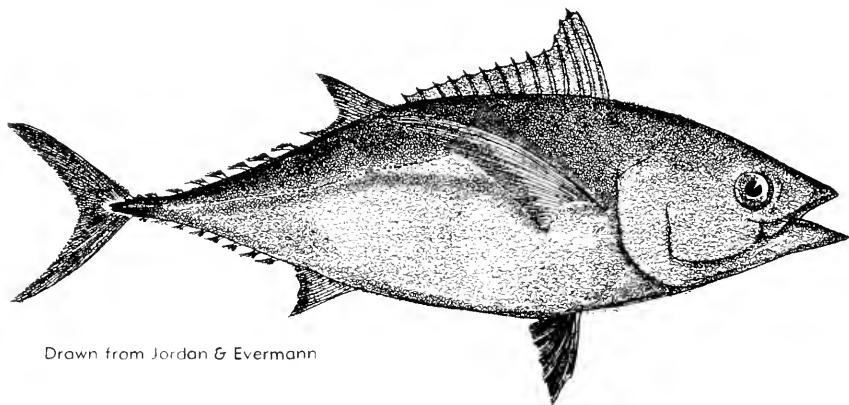
Haranaga, Hirenaga, Kihata, or Kiwada

75-9 *Neothunnus macropterus* (Schlegel)

Plate I, Figure 5

The yellow-fin tuna is a large species with dark steel blue reflection above and silvery beneath. It may be distinguished from all other species by the bright yellow color of its finlets. The body is covered with scales, the tail bears a keel on either side, and the body is not marked by stripes. During life this fish is brilliantly colored with golden stripes along the body, but these fade with death. It will reach 450 pounds in weight.

The yellow-fin tuna feeds on all ocean going fishes including flying fishes, sauries, sardines, plankton, and other creatures. Since the young are never seen near shore it is thought to spawn in off-shore waters. It is a valuable commercial fish off Mexico and Central America.



Drawn from Jordan & Evermann

The much debated Allison tuna of sportsmen is thought by many to be old specimens with long fins.

The yellow-fin tuna inhabits the surface waters of the entire tropical Pacific Ocean.

Thread Tuna

Also known as Itoshibi (Thread Tuna) or Gesunaga

75-10 *Semathunnus itosibi* (Jordan & Evermann)

This rare fish is "known by the elongated soft dorsal and anal, their slender tips reaching at least to median finlet." It is a dusky blue in color above, with silvery sides and without distinct markings. The finlets of this fish are of a brighter yellow color than those of any other members of the family. It is reported to reach a very doubtful length of nine feet. This fish is reported from Japan and from Hawaiian waters.

Bonito, Chile Bonito, or Skipjack

75-11 *Sarda chilensis* (Cuvier)

This bonito is of a metallic bluish color above, pale or silvery below, and is marked on the sides with about five dark blue lines running obliquely backward and upward. Specimens in southern waters are reported to be darker than those in more northern waters. The finlets number eight above and six below. The corselet of scales extends beyond

the pectoral fin. This fish reaches an average size of twelve pounds. The flesh of this fish is coarse, dark red and oily in texture but is reported to be excellent if it is steam boiled rather than fried in a pan.

The California bonito *S. lineolatus* (Girard), the Mexican bonito, *S. velox* Meek and Hillebrand, and the Chilean bonito *S. chilensis* (Cuvier) are very hard to distinguish from each other. Some authors suggest that this is not a problem because each has a definite geographical limit.

The Chile bonito inhabits the open Pacific Ocean from Japan to San Francisco and southward to Patagonia. It travels in schools feeding on small fry, anchovies, shrimp, and squids. It is reported to be more abundant in the northern sections of its range during the summer months.

Thompson's Tuna

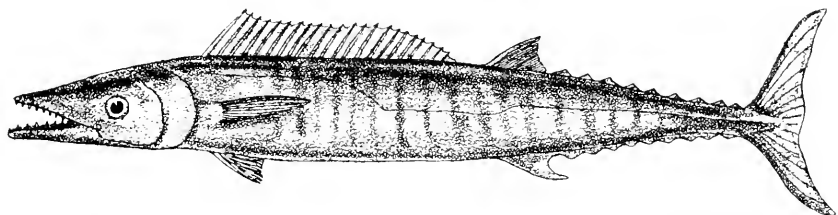
75-12 *Grammatorcynus thompsoni* (Fowler)

One specimen of this fish is known from Honolulu. It measured about three feet in length.

Wahoo or Ono

Also known as the Peto, Pacific King Fish, or Queenfish

75-13 *Acanthocybium solandri* (Cuvier)



The ono is an elongated mackerel with a slender cigar-shaped body and a long pointed head. It is steel blue in color above and paler below. The fins are the same color as the body. The body is marked by a series of vertical bars running from the back toward the belly, but fading out on the sides. The belly of the fish varies from white or whitish to an iridescent blue. The dorsal fin is long and the tail is thick, heavy, and dark in color.

The ono reaches a length of five or six feet and will weigh from fifty to one hundred pounds. This fish is a large, fast swimming, predatory fish. It prefers to travel alone and is seldom found in schools. It is a good food and game fish, is often found near floating objects, and may be taken with a trolling hook.

"The ono was said by the ancient Hawaiians to be the parent of the Opelu (mackerel)."

The ono is a circumtropical species and is pelagic in all warm seas.

THE ESCOLAR OR OIL FISH FAMILY

Also known as the Snake Mackerels

76 Family *Gempylidae*

The escolars are mackerel-like fishes with elongated, band-shaped bodies which are covered by minute scales. Like the mackerels they have a brilliant metallic color. The surface species are silvery in color while the deep water forms are a violet black color. The mouth is set with very large and sharp teeth.

The escolars are fishes of the high seas. They are widely distributed and may be either pelagic or descend to considerable depths. They are reported to breed about rocky islands. Most of the species are used as food.

Of more than fifteen known species, only three are known from the Hawaiian Islands.

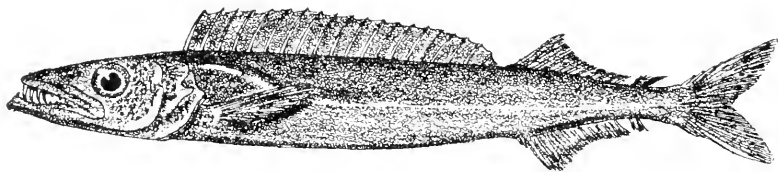
Snake Mackerel or Hauliuli Puhi

76-1 *Gempylus serpens* Cuvier

The snake mackerel is slender in shape, of a dark metallic blue color, and reaches a length of about three feet. It is a voracious fish of the deep sea and is widely distributed. It has a firm flesh.

Rabbit Fish or Conejo

76-2 *Promethichthys prometheus* (Cuvier)



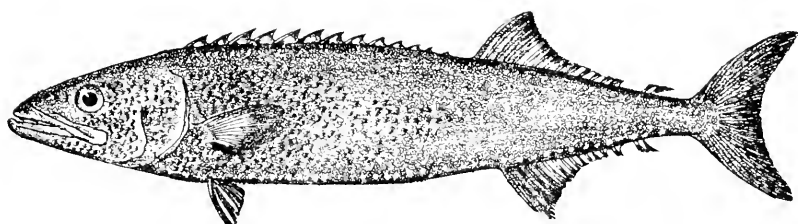
Drawn from Jordan & Evermann

The rabbit fish has an elongated slender body and head. It is of a steel blue color and is marked with black. It will reach a length of almost two feet. It is circumtropical in its distribution.

Common Escolar or Walu

Also known as the Black Escolar, Oil Fish, Ponkfish, or Palu

76-3 *Ruvettus pretiosus* Cocco



Drawn from Jordan & Evermann

The common escolar is a very large fish with very rough scales. It is almost black in color and reaches a length of six feet and will weigh more than one hundred pounds. The flesh of this fish is white, flaky, soft, and full of oil.

It is a circumtropical species and seems to prefer to live at depths between 200 and 400 fathoms. It is uncommon in the Hawaiian Islands.

THE SAILFISH, SPEARFISH AND MARLIN FAMILY

Also known as the Spike Fish and erroneously called Swordfish

77 Family *Istiophoridae*

The spearfishes are large fishes in which the consolidated bones of the upper jaw form a rostrum which is prolonged into a spear. They are all of a brilliant metallic coloration, all have feeble teeth, and all have the ventral fin reduced to two or three rays. The males are smaller than the females.

These fishes are sometimes confused with the broadbill swordfish. They may be distinguished by the fact that in this family a large dorsal fin extends almost the length of the back and the ventral fins of five rays are each fused into one ray. Two keels occupy each side of the tail, teeth are present, scales are imbedded in the skin, and the spear is round, rather than flat.

The spearfishes are found in all warm seas. They move northward with the summer seasons to feed on other fishes including mackerels, sardines, flying fishes, bonitos, squids and cuttlefish. They are reported to kill their victims in schools by slashing about with their spear, thereafter

leisurely eating the wounded. It is also reported that the spearfishes are chased and eaten by large sharks.

The marlins are highly prized by sportsmen for their fighting qualities. They have an interesting habit when hooked on a line of plunging into the air.

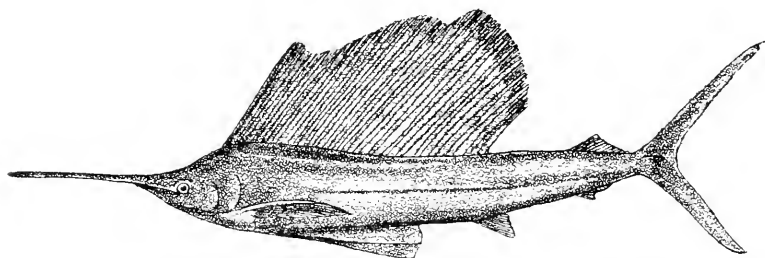
These fishes are reported as excellent food and are commonly sold on markets.

They are named marlin because their spear resembles a marlin spike. Four members of this family occur in Hawaiian waters.

The Pacific Sailfish

Also known as the Indian Sailfish, Banana Sailfish, and Kansekan

77-1 *Istiophorus orientalis* (Schlegel)



The Pacific sailfish reaches a length of nine or ten feet. It is plain bluish black in color over the body and is marked on the dorsal fin by a number of round black spots. It lives in warm seas and migrates northward with the seasons to feed. It is a fast swimmer, a good eating fish, and a good sport fish. It is known from the Indian Ocean across the entire tropical Pacific Ocean.

The Pacific Striped Marlin or Barred Marlin

Also known as Marlinspike Fish, Marlin Swordfish, Barred Marlin,

Mitsukuri's Marlin, Makajiki (True Spearfish), Kajiki Maguro (Spearfish Tunny), Nairage, Baisen, and Bakudo

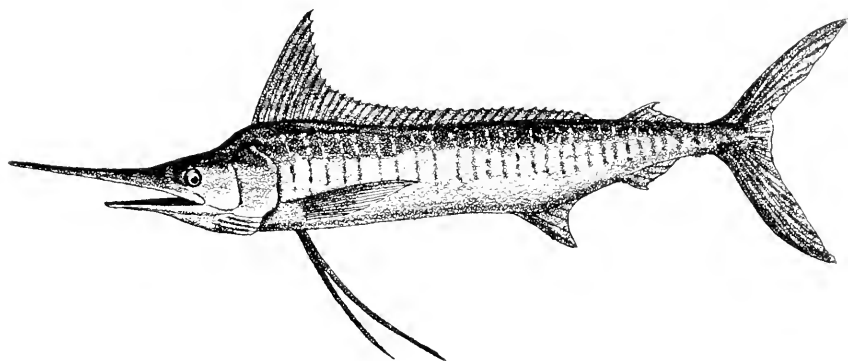
77-2 *Tetrapturus mitsukurii* Jordan & Snyder

Plate I, Figure 4

The Pacific striped marlin is a dark blue-black color on the back and whitish beneath. The sides of the body are marked with twelve to seventeen pale blue bars which reach almost to the belly. The dorsal fin is black. This fish will weigh from 400 to over 1,000 pounds and

is reported to swim forty miles per hour. A smaller species than the black marlin, it is the most common member of this family.

The Pacific striped marlin is distributed throughout the tropical and sub-tropical Pacific Ocean from southern California to Japan. It seems



to prefer more temperate waters and migrates with the seasons. It appears along the Pacific coast of the United States from August to November and then disappears.

It was named for Dr. Kakichi Mitsukuri, professor of zoology, in the Imperial University at Tokyo.

Short-Nosed Spear Fish

77-3 *Tetrapturus brevirostris* (Playfair)

This fish is uniform in color above and is marked by a faint streak along the side. The body is not marked with either cross bars or spots, although the dorsal is mostly black and the pectorals which are mostly gray are edged with black.

This spearfish is recorded from the Indian Ocean and from the Hawaiian Islands.

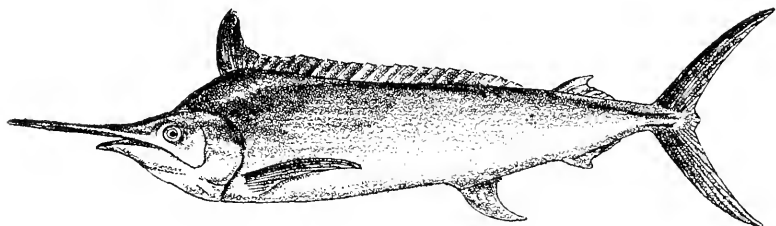
Black Marlin or Au

Also known as Kurokajiki (Black Spearfish), Mazaara (Real Swordfish), and Kuroko (Black Marlin)

77-4 *Tetrapturus mazara* Jordan & Snyder

The black marlin is a dark blue-black color above and paler below. The pectoral fins are long and black and the dorsal fin is sometimes marked by round, dark spots. The body is marked by about sixteen faint

crossbars along the back but which do not reach the median line. This fish is reported to reach a length of fourteen feet and to weigh over 1,000 pounds. It is the largest member of its kind.



The black marlin is a tropical species and is found from Japan to California. It is common in the Hawaiian Islands.

In the past the species of marlins have been somewhat confused and there is still some doubt if this is a distinct species. Many authorities feel that this fish represents an old individual of a white or striped marlin.

SWORDFISH OR BROADBILL FAMILY

78 Family *Xiphiidae*

This family contains a single species related to the marlins. It differs from the marlins by the absence of the scales, teeth and ventral fins in the adults, by the single keel on the tail, by the high and short dorsal fin which does not extend beyond the middle of the body, and by the flat (marlins are rounded) spear or rostrum. It will reach a length of twenty feet and weigh over 1,000 pounds.

Common Swordfish or Au

Also known as the Broadbill Swordfish and Espadon

78-1 *Xipbias gladius* Linne

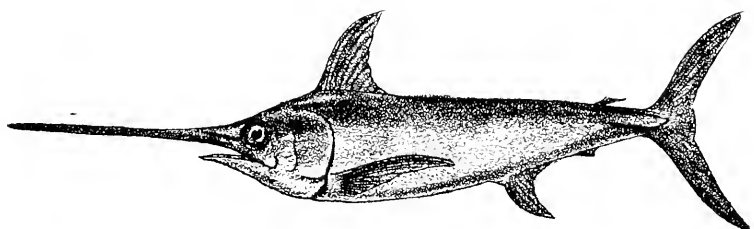
Plate I, Figure 3

The swordfish is of a dark metallic purplish color above and dusky beneath. The fins are dark and silvery and the sword is black above and light beneath.

The swordfish is very muscular and a very rapid swimmer. It travels near the surface in pursuit of the schools of mackerel and other fishes on which it feeds. It is reported that the swordfish will slash about in the school with its sword and then eat the wounded fishes at its leisure.

The swordfish is a surface swimmer only in calm weather. It may often be seen basking at the surface with the tip of the fin and the tail

protruding. It is thought to spawn in offshore waters from December to April and thereafter to migrate northward to coastal waters to feed during the summer and fall.



The swordfishes are caught extensively in the Atlantic Ocean for sale in the markets. It is a good fish and has a dark red-colored oily flesh. It is the greatest of game fishes and very difficult to land. The name of Xiphias was bestowed upon the fish by Aristotle.

The swordfish is circumtropical in its distribution and is found in both the Atlantic and Pacific Oceans.

There are a number of stories in which beaked fishes have rammed ships. Although the stories are credited to swordfish, they probably were actually marlins. The habit of spearing ships is a rather stupid one because it usually ends in self destruction. The poet Oppian put the story beautifully in the following lines:

"Nature her bounty to his mouth confined
Gave him a sword, but left unarmed his mind."

THE DOLPHIN OR DORADO FAMILY

79 Family *Coryphaenidae*

The dolphin fishes are not to be confused with the true dolphins which are miniature whales. The dolphins are large fishes with compressed bodies and a long dorsal fin. The head is high in the male and bears a crest. The family lives in mid-ocean in all tropical and temperate seas.

The family contains two species, both of which are found in Hawaiian waters.

Common Dolphin or Mahi-mahi

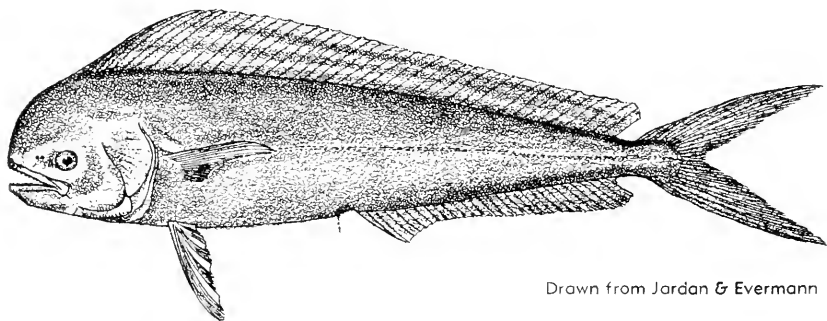
Also known as the Dorado, Mahihi, Mahi-mahi Lapa, or Mahi-mahi Oma

79-1 *Coryphaena hippurus* Linne

Plate I, Figure 1

The mahi-mahi is noted for its brilliant and rapidly changing colors especially when dying. The body is green or blue above and apple green

to silvery white beneath. The entire body is covered by emerald green or light blue spots making a very beautiful pattern in life. The dorsal fin is purplish, while the other fins are yellowish in color. The dorsal fin



Drawn from Jordan & Evermann

is unusually long and runs from the head to the tail; the anal fin is similar to the dorsal fin but shorter. The males may be distinguished from the females by their high forehead. The fish will reach a length of six feet.

The dolphin is a strong swimmer and is reported to be the speediest of all fishes and capable of making forty miles an hour. It feeds on anchovies, half-beaks, mackerels, large plankton, and is reported to chase flying fishes.

It is a very gamy fish and has an excellent quality flesh.

The dolphin fish is found in all warm and tropical seas. It is widely distributed in mid-ocean, but is nowhere abundant.

Small Dolphin

79-2 *Coryphaena equiselis* Linne

The small dolphin is sea green above and silvery beneath. The head is marked with brown stripes, while the body is covered on the back and sides with scattered black spots. It rarely exceeds thirty inches in length. It is a much rarer species than the larger dolphin. This dolphin is pelagic in warm open seas.

THE SEA-BREAM AND POMFRET FAMILY

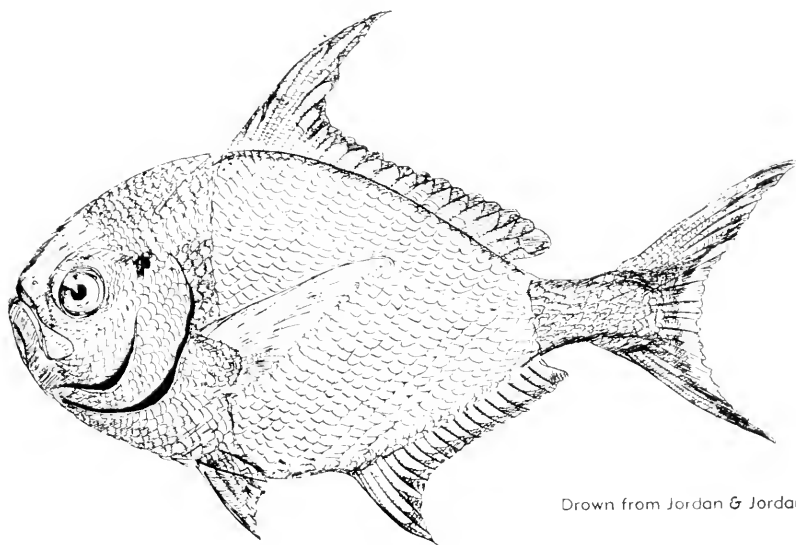
80 *Family Bramidae*

The bodies of these fishes are strongly compressed and change greatly with age. They are all fishes of the open sea and often live at considerable

depths. They are a small family and widely distributed. Three species are known from Hawaiian waters.

Pomfret or Black Bream

80-1 *Brama raii* (Bloch)



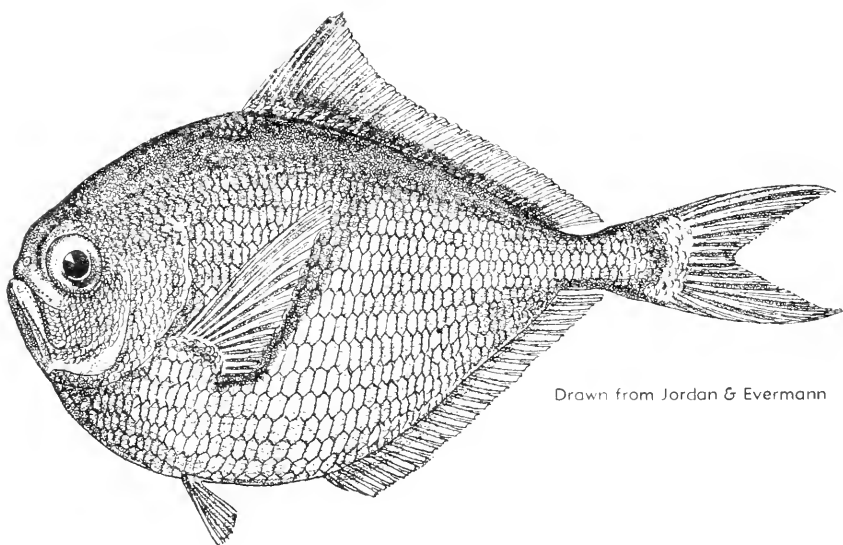
Drawn from Jordan & Jordan

The pomfret is sooty-gray or black in color with some silvery markings and reaches a length of four feet. It is a pelagic fish of the open sea and is widely distributed in both the Atlantic and Pacific Oceans. It also descends to considerable depths. Although it is uncommon and not often captured, it is an excellent food fish.

Pomfret

80-2 *Collybus drachme* Snyder

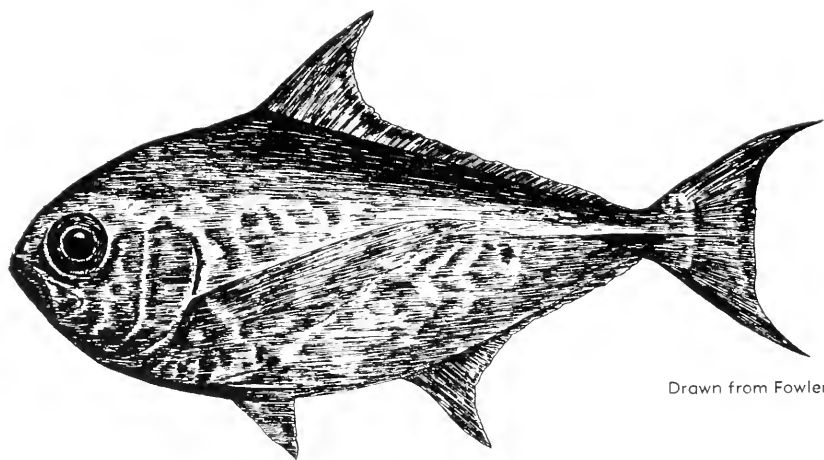
This pomfret has the body greatly compressed. It is bright silvery in color, has the dusky markings along the back, and reaches a length of at least eight inches. It ranges from the surface down to 700 fathoms. Squids and other fishes form the bulk of its diet. It is an uncommon species found in the Hawaiian Islands.



Drawn from Jordan & Evermann

Steindachner's Pomfret

80-3 *Taractes steindachneri* (Doderlein)



Drawn from Fowler

This pomfret has an ovate body which is strongly compressed. It is uniform dark brownish in color and reaches a length of two feet. It is found in Japan and in the Hawaiian Islands.

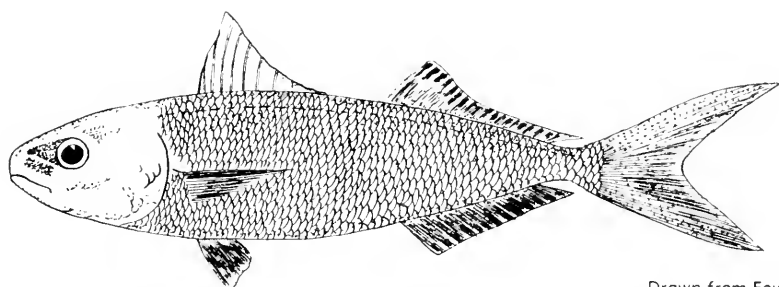
THE RUDDER FISH OR BUTTER FISH FAMILY

81 Family *Centrolophidae* (*Stromateidae*, *Nomeidae*)

The rudder fishes are nearly all small fishes with oblong bodies. They are nearly all pelagic and are most often found under floating medusae and in the bodies of tunicates.

Three species of this family are recorded from the Hawaiian Islands.

Evermann's Rudder Fish

81-1 *Cubiceps evermanni* (Jordan & Snyder)

Drawn from Fowler

This rudder fish is bluish in color and has large firm scales. It measured about eighteen inches in length and is known from three specimens taken in the Hawaiian Islands.

Rudder Fish

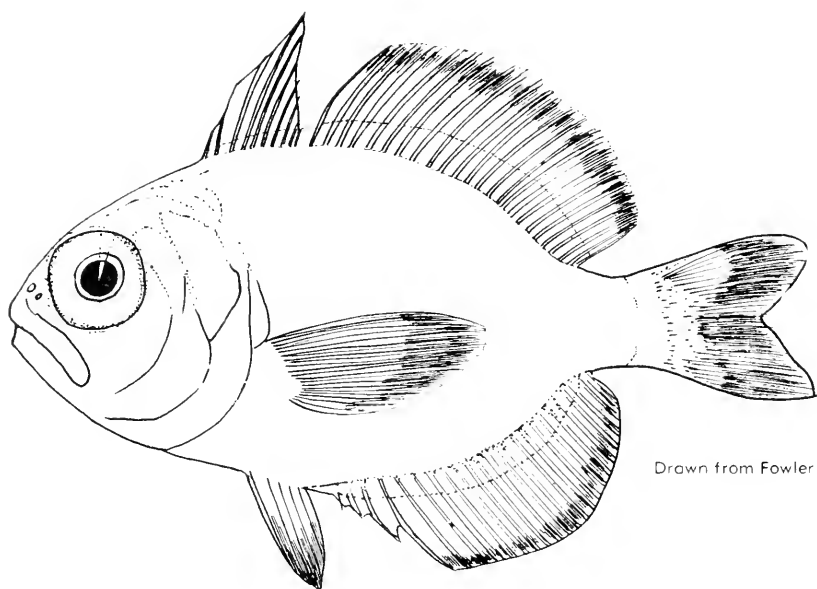
81-2 *Nomus gronovii* (Gmelin)

This rudder fish is striped with blue and silver and reaches a length of about two inches. It is circumtropical in its distribution.

Rudder Fish

81-3 *Psenes arafurensis* Gunther

This rare fish is known from two specimens taken in the Arafura Sea and at Gardner Island in the Hawaiian Archipelago. The Hawaiian specimen measured almost three inches in length.



THE SQUARE TAIL FISH FAMILY

82 Family Tetragonuridae

The square tails are fishes of plump or almost squarish form and have their bodies covered with numerous hard and firm scales. The family contains but a single species which has been taken in Hawaiian waters.

The Square Tail or Escolar de Natura

82-1 *Tetragonurus cuvieri* Risso

The square tail is a curious fish and is reported to appear as if it had been whittled out of wood. A uniform rusty black color, its plump and compact body is covered with an armor of bony scales. The tail is distinctly four angled with ridges which run into the forks of the fins to form serrated keels. It reaches a length of about twelve inches.

A fish of the open sea, it is reported to swim slowly in deeper waters.

It is known from the Mediterranean Sea, and the Atlantic and Pacific Oceans. One four-inch specimen has been recorded from the Hawaiian Islands.

THE POMPANO FAMILY

Also known as the Cavalla, Jack, Amberjack, and Trevally Family

83 Family *Carangidae*

The family of the pompanos is related to the family of the mackerels. It may be separated from the mackerels by the presence of two separate spines in front of the anal fin and by the fact that there are a number of bony plates along the caudal peduncle and the posterior part of the lateral line.

The members of the group are swift swimmers and are widely distributed. They abound in warm waters and migrate northward during the summer months. Most of the members are valued as food although a few species are small and unimportant.

Of more than 200 species known in the entire world, at least thirty have been recorded from Hawaiian waters.

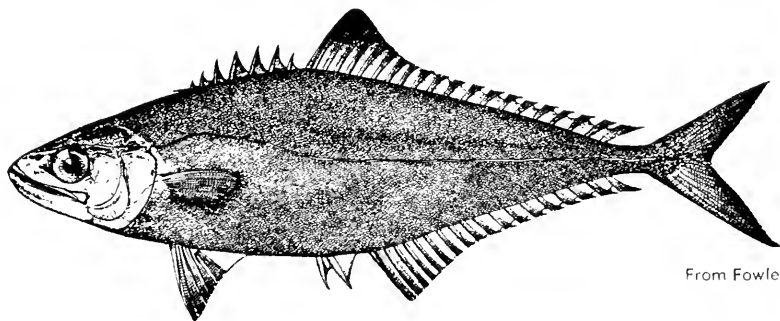
Leatherback, Runner, or Lai

83-1 *Scomberoides toloo parab* (Ruppell)

The runner is bluish silvery color above and whitish beneath. It reaches a length of about eighteen inches and is a fairly common fish.

This fish is widely distributed in the Indo-Pacific area, being found from the Red Sea eastward through the East Indies to Polynesia and the Hawaiian Islands.

Leatherback, Runner, or Lai

83-2 *Scomberoides sancti-petri* (Cuvier)

From Fowler

This fish is a slaty bluish color on the back, whitish beneath, and reaches a length of two feet. It is not a common species, although it

is widely distributed. It is found from the Red Sea eastward through the East Indies and Polynesia to the Hawaiian Islands.

Leatherback or Runner

83-3 *Scomberoides tala* (Cuvier)

This leatherback is light gray with silvery reflections above and silvery white in color beneath. The tips of the ventral fins and the lower margin of the caudal fin are white. Specimens measure from six inches to one foot in length.

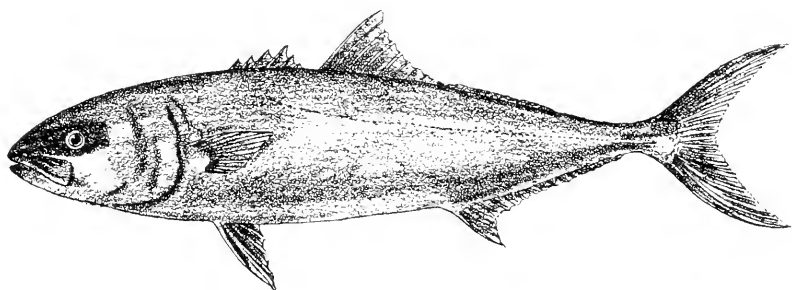
This species is distributed from the Malabar coast of India through the East Indies to New Guinea, New Ireland, Santa Cruz Islands, Samoa, and the Hawaiian Islands.

California Yellow-Tail

Also known as the Amberjack, Amberfish, White Salmon, and Coronado

83-4 *Seriola dorsalis* (Gill)

Plate III, Figure 4



The California Yellow-Tail is one of a group of amberfishes belonging in the Pompano Family. It is a fish averaging about eight pounds in weight but often exceeding three feet in length and weighing over fifty pounds. It is steel blue in color above and silvery on the sides and belly. It is marked by an irregular brassy yellowish-brown stripe running from the snout through the eye and along the side of the body to the tail which in turn is yellow in color.

The habits of the California Yellow-Tail are interesting. It moves northward during the summer months and is very common from Catalina, the Coronado Islands, and Santa Barbara Islands southward along the coast of California and Mexico during the summer and fall. Although the California Yellow-Tail may be caught at any time of the year, it is

most common during the months from July to October following the spring spawning.

The Yellow-Tail travels in schools of sufficient size to churn up the water where they occur. They pursue and devour flying fishes, herring, sardines, mackerels, anchovies, kingfish, smelt, and other schooling fishes as well as shrimp.

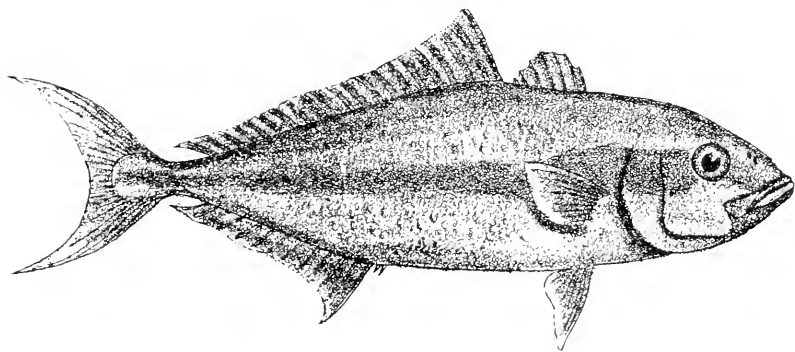
The Yellow-Tails are an important game and commercial fish and are caught in large numbers during the summer months. Game fishermen obtain them by trolling, while the commercial fishermen catch them by "chumming" in a manner similar to that of tuna, by purse seine and gill nets, and by hooks and lines. These fishes are famous among sportsmen for their lust when taking the hook and for their long rapid series of runs when hooked.

This fish is distributed along the western coast of America from Monterey and the Santa Barbara Islands southward to Cape San Lucas, Mazatlan, Panama, and the Galapagos Islands. This fish was recently unofficially reported as caught off the coast of Molokai.

Amberfish or Yellow-Tail

Also known as the Coronado, Pua-Kahala, or Kahala

83-5 *Seriola dumerili* (Risso)



The amberfish is grayish or light brown in color above and silvery beneath. It is conspicuously marked by a lemon yellow band along the entire side of the body. It is a robust fish and will reach a length of six feet. The sides of the tail have a low smooth keel.

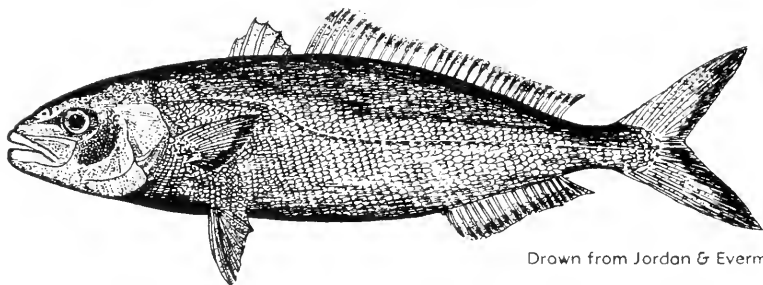
The amberfish lives in schools and feeds on small fish and squids. It is a good food fish.

This fish is widely distributed in warmer waters. It is found from Japan to the Hawaiian Islands, in the West Indies, and in the Mediterranean Sea.

Amberfish or Yellow-Tail

Also known as the Kahala Opio and Bluefish

83-6 *Seriola aureo-vittata* Schlegel



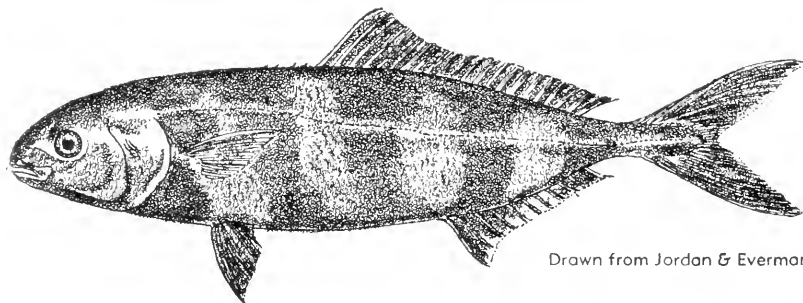
Drawn from Jordan & Evermann

This fish has a robust body, a low smooth keel on the side of the tail, and an anal fin which is shorter than the soft dorsal. It lives in schools and is a fair food fish. It is found from Japan to the Hawaiian Islands.

Pilot Fish

Also known as the Romero, Annexation Fish, or Pua-Kahala

83-7 *Naucrates ductor* (Linne)



Drawn from Jordan & Evermann

The pilot fish is bluish in color and is marked with five to seven broad vertical bands which extend onto the fins. A keel is present on the tail.

This fish gets its name of pilot fish from the fact that it follows ships and is often found accompanying sharks. They are called annexation

fishes in Hawaii because they appeared there in large numbers at the time of the annexation of the Hawaiian Islands to the United States.

The pilot fishes spawn in the open sea. The young are found in small groups under jellyfishes and elsewhere and have no resemblance to the adults.

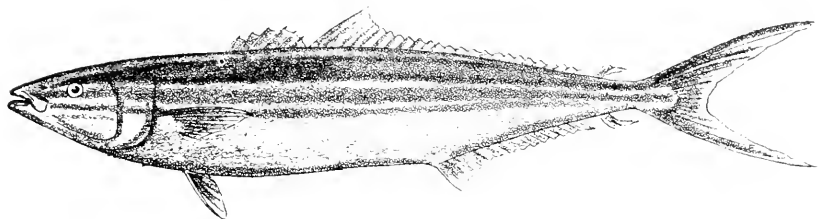
The pilot fish is pelagic in all warm seas and ranges widely, but it is nowhere common.

Runner

Also known as the Rainbow Runner, Yellow-Tail, Skipjack,
Shoemaker, and Kamanu

83-8 *Elagatis bipinnulatus* (Quoy & Gaimard)

Plate III, Figure 2



This fish is marked by two conspicuous blue bands along the side of the body. It is easily identified by the fact that it has one detached finlet behind the dorsal and anal fins. There are no shields along the lateral line. It is a large fish and will reach a length of three feet.

The runner is a pelagic fish and is circumtropical in distribution.

Jack

83-9 *Megalaspis cordyla* (Linne)

This fish is pale greenish or bluish and white in color and is marked by a black spot on the operculum. The body has many finlets and the bony plates on the lateral line are highly developed. The fish reaches a length of about five feet.

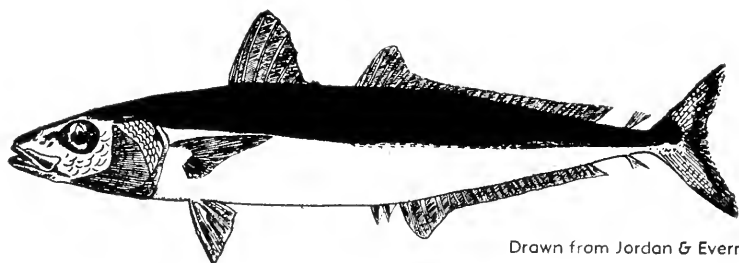
This fish is found from the Red Sea and east Africa eastward through the East Indies and throughout Polynesia to the Hawaiian Islands.

Mackerel Scad or Opelu

Also known as Opelu Kika (Fingerlings)

83-10 *Decapterus sanctae-helenae* (Cuvier)

The opelu is bluish above, almost white beneath, and is marked by a darker area on the gill covers. The dorsal and anal fins are followed by a single finlet. It reaches a length of fifteen inches.



Drawn from Jordan & Evermann

The opelu is pelagic in the tropical parts of the Atlantic and Pacific Oceans.

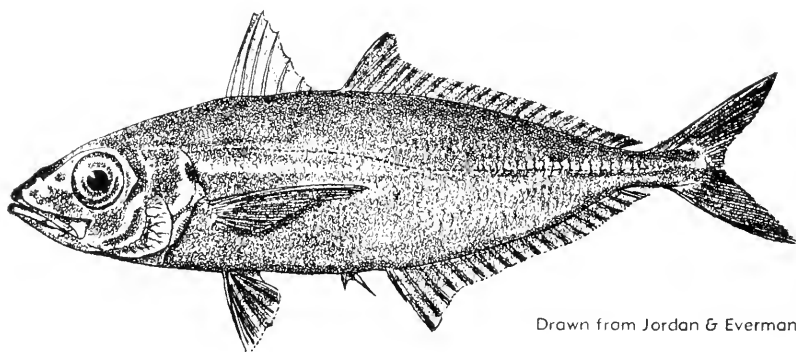
Scad

83-11 *Decapterus maruadsi* (Schlegel)

This fish reaches a length of at least twelve inches. It has been recorded from Japan and the Hawaiian Islands.

Big Eyed Scad or Akule

83-12 *Selar crumenophthalmus* (Bloch)

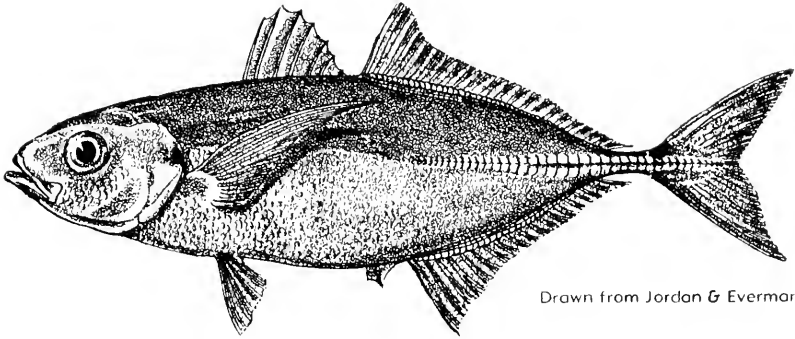


Drawn from Jordan & Evermann

The akule is bluish green above, silvery on the sides, and white on the belly. It reaches a length of one foot. It is abundant and well known in Hawaiian waters and next to the ulua and the ama is one of the most important food fishes in Hawaii.

The akule is circumtropical in its distribution.

Pua Kahala
83-13 *Caranx mate* Cuvier

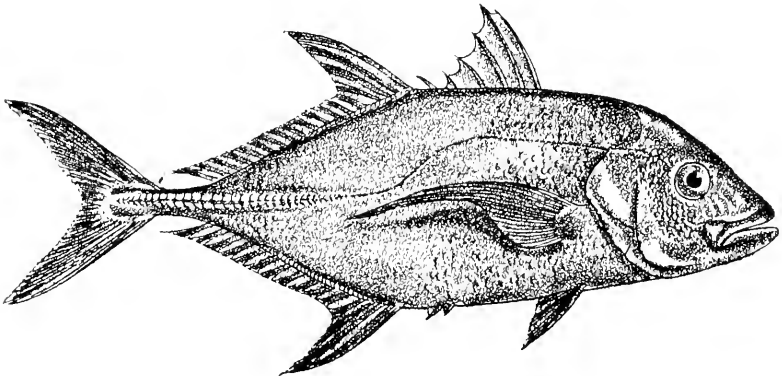


Drawn from Jordan & Evermann

This fish is bluish above and whitish beneath. It reaches a length of at least one foot. The young of this fish live under jellyfishes until they are of sufficient size to travel by themselves.

This fish is distributed from the Red Sea through the East Indies to Tahiti and the Hawaiian Islands.

Omilimilu
Also known as the Ulua and Papiopio
83-14 *Caranx melampygus* Curvier



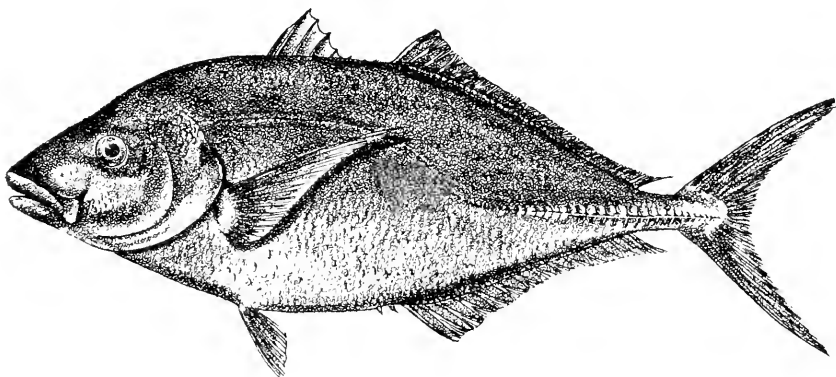
Drawn from Jordan & Evermann

The Omilimilu is a silvery bluish-green or brownish above and lighter beneath and is marked with black and dark blue spots. It reaches a length of two feet. This fish is a common food fish in the markets.

It is widely distributed in the tropical Atlantic, Pacific, and Indian Oceans.

Cavalla

83-15 *Caranx cheilio* (Snyder)



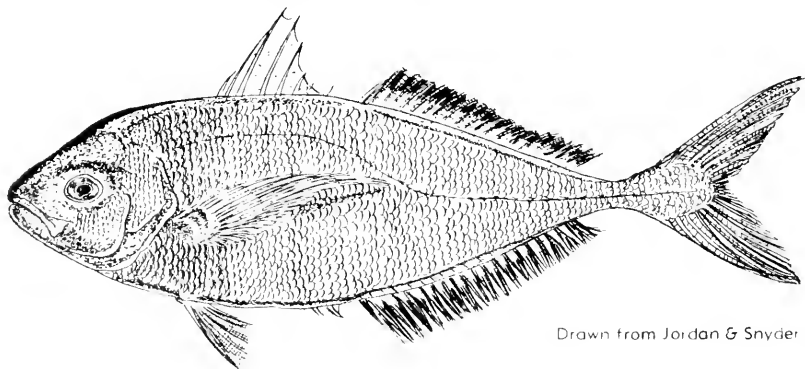
Drawn from Jordan & Evermann

This cavalla is silvery and brownish in color above and whitish beneath. It is one of the larger species and reaches a length of thirty inches.

It is an uncommon fish in the Hawaiian Islands. It is widely distributed in the tropical waters of the Atlantic and Pacific Oceans.

Cavalla

83-16 *Caranx dason* Jordan & Snyder



Drawn from Jordan & Snyder

This cavalla is a silvery color above and whitish beneath. The dorsal and anal fins are dusky to blackish in color. It reaches a length of twenty inches. This fish is known from the entire Hawaiian Archipelago.

Cavalla

83-17 *Caranx kalla* Cuvier

This fish reaches a length of at least twelve inches. It is distributed from the East Indies and New Guinea to the Hawaiian Islands.

Blue Crevally

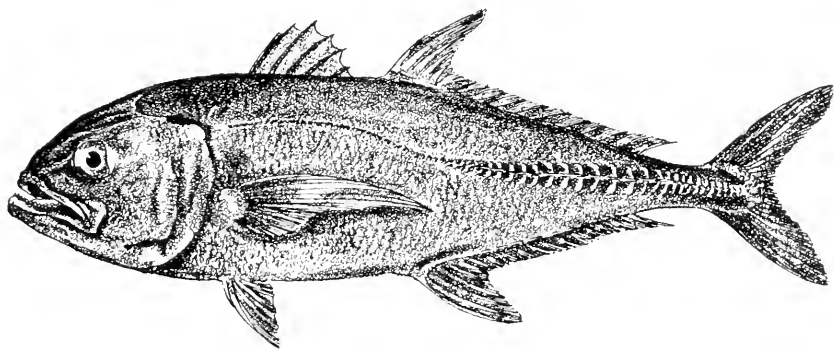
83-18 *Caranx stellatus* Eydoux & Souleyet

Plate III, Figure 1

The body of this fish is bluish in color and the head, back, and sides are covered with black spots. The bases of the dorsal and anal fins are a brilliant blue in color. This crevally reaches a length of about three feet. It feeds on little fishes. It is distributed throughout tropical Polynesia.

Cavalla

83-19 *Caranx elacate* (Jordan & Evermann)



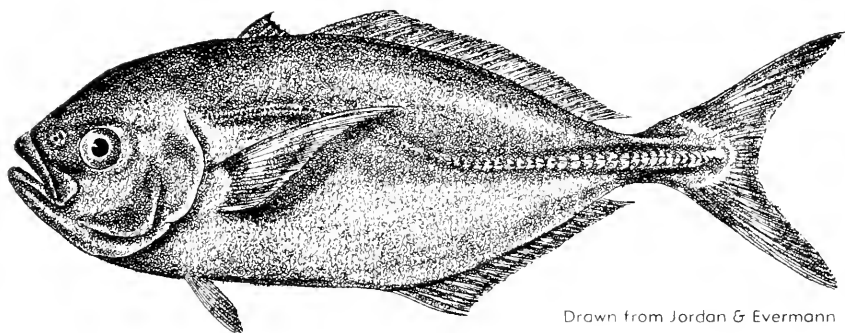
Drawn from Jordan & Evermann

This fish is described as a dusky olive color above and whitish beneath. It measures about thirty inches in length. It is an uncommon species found in the Hawaiian Islands.

Cavalla

83-20 *Caranx belvolus* (Schneider)

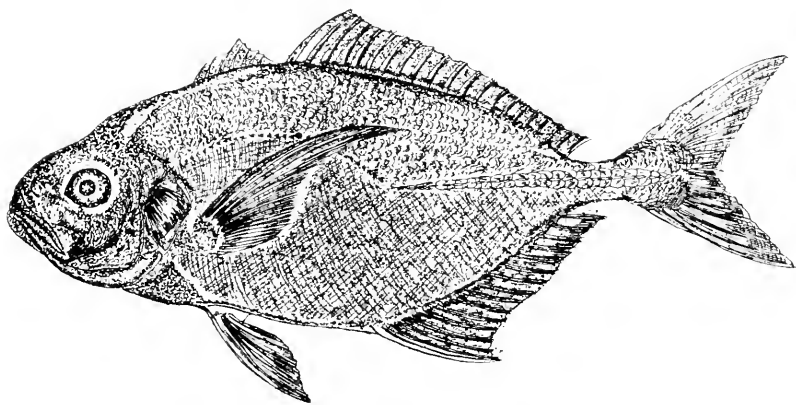
The color of this species varies from specimens which are dark over the entire body to individuals which are tinged with yellow. It measures about fifteen inches in length and is found in the Hawaiian Islands.



Drawn from Jordan & Evermann

Cavalla

83-21 *Caranx uraspis* Gunther



Drawn from Jordan, Evermann & Tanaka

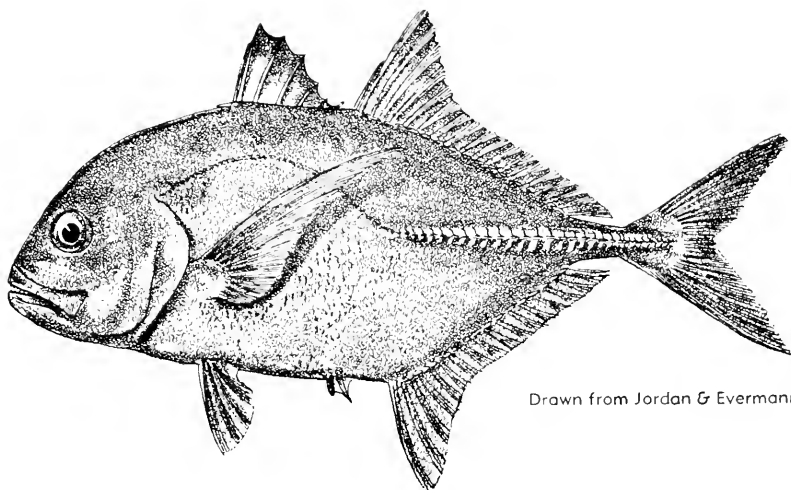
This fish was described as pale green in color above and silvery beneath in alcohol. It measured about five inches in length and was recorded from the Hawaiian Islands and elsewhere in the Pacific Ocean.

Pauu

Also known as the Pauu, Cavalla, Jack, Papiopio (small), and Ulua (large)

83-22 *Caranx ignobilis* (Forsk.)

This fish is a yellowish, pale olive, or greenish color in life with a greenish head and white sides and belly. It is recognized by the yellow color of the anal fin. It reaches a length of three feet.



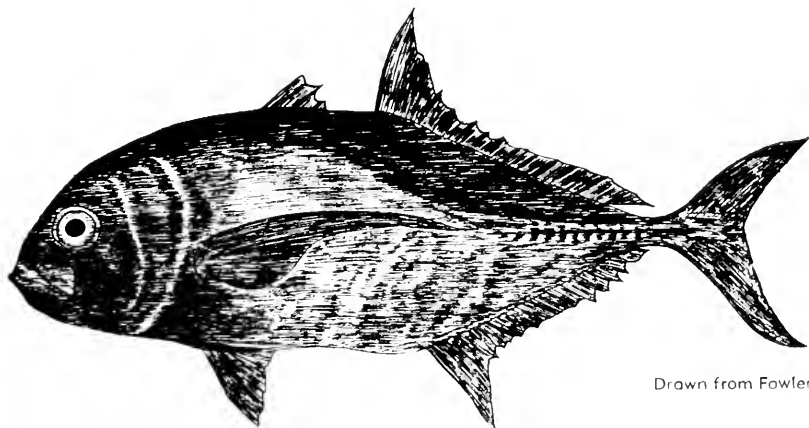
Drawn from Jordan & Evermann

A common fish in the Hawaiian Islands, it is one of the most abundant and valuable food fishes of the group.

This fish is widely distributed in the Pacific Ocean. It is found from East Africa eastward through all of the warm tropical waters of the Pacific Ocean to the coast of California.

Brown Jack or Cavalla

83-23 *Caranx lugubris* Poey



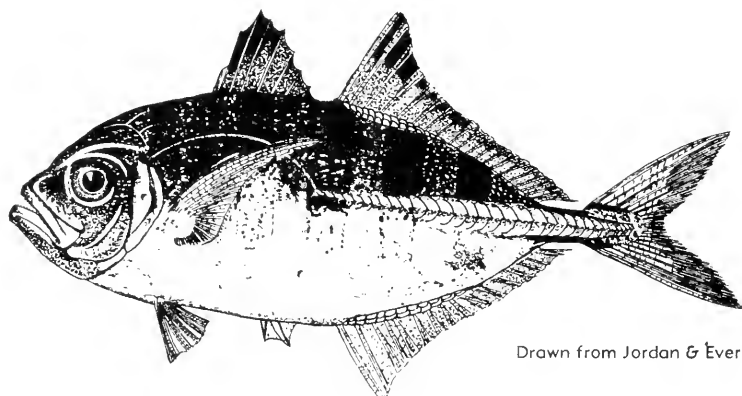
Drawn from Fowler

This cavalla is of a dark, dusky, uniformly brownish-black color. It reaches a length of two feet and is common about rocky islands in the tropical waters of both the Atlantic and Pacific Oceans.

Ulua

Also known as the Horse-Eye Jack, Big-Eye Jack, Hard Tail, Jurel, Runner, Omilimilu, Papiopio (young), Pauu (young) and Ulua (large)

83-24 *Caranx sexfasciatus* Quoy & Gaimard



Drawn from Jordan & Evermann

The ulua is pale bluish in color above and changes to a silvery white on the sides and belly. It is recognized by its yellow pectoral fin and dusky anal fin. It reaches a length of forty inches.

The ulua is common in the Hawaiian Islands and throughout the Indo-Pacific area.

It is one of the most important food fishes of the South Seas. Its abundance in fish markets is proof of its quality as a food fish.

Paopao or Dorade

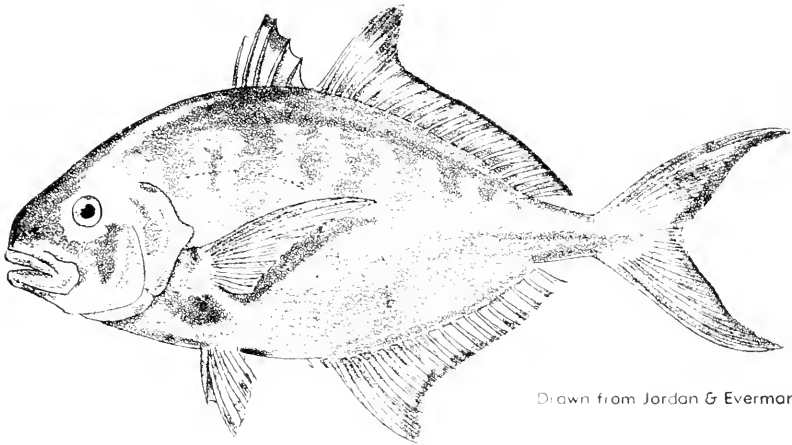
Also known as the Ulua Pauu and Mojarra Dorada

83-25 *Gnathanodon speciosus* (Forsk.)

Plate III, Figure 3

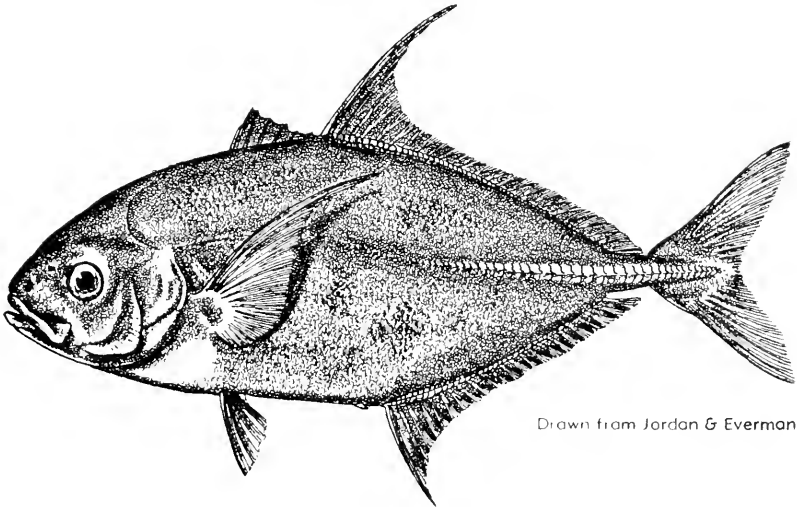
This fish is light dusky in color above with silvery, golden, and blue reflections and white beneath. It is marked by eight or nine transverse bands on the body and reaches a length of about two feet.

This fish is distributed from the eastern coast of Africa eastward through all of the warm tropical waters to the coast of California.



Drawn from Jordan & Evermann

Omilimilu or Cavalla
83-26 *Carangoides ferdan* (Forsk.)



Drawn from Jordan & Evermann

The Omilimilu is grayish silvery in color above with dark blue reflections over the upper portion of the back and head. It reaches a length of about forty inches.

It is distributed from the eastern coast of Africa through the East Indies and the many islands of Polyensia to the Hawaiian Islands.

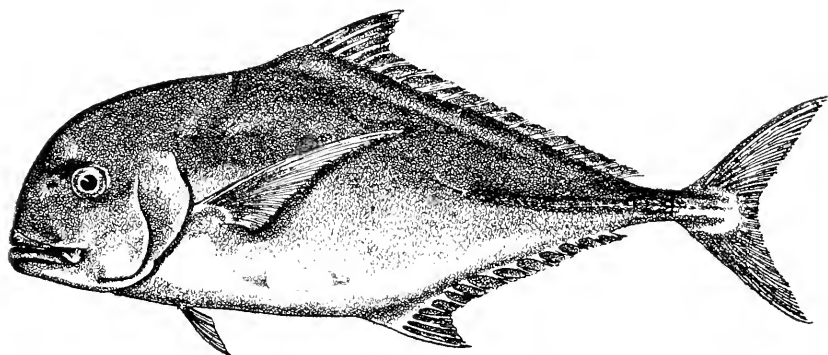
Cavalla

83-27 *Carangoides gymnostethoides* Bleeker

This fish is described as a uniform brownish color above and lighter beneath. It reaches a length of twenty inches and is not a common fish. It is distributed from India through the East Indies to the Hawaiian Islands.

Cavalla

83-28 *Carangoides ajax* Snyder



Drawn from Jordan & Evermann

This fish is silvery in color being darker above than below and is marked with indistinct marblings along the back. It reaches a length of forty inches. It is recorded from the Hawaiian Archipelago.

Cavalla

83-29 *Carangoides equula* (Schlegel)

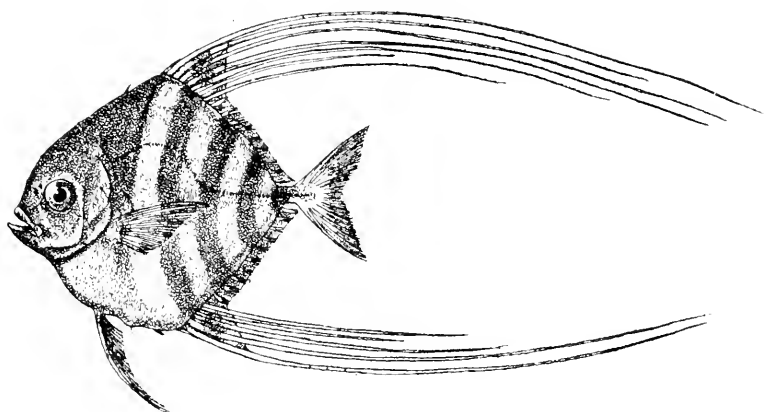
This member of the pompano family is found in Japan, Formosa, and in the Hawaiian Islands.

Ulua Kihikihi

Also known as the Thread Fish, Cobbler Fish, Sunfish, or Shoemaker

83-30 *Blepharis ciliaris* (Bloch)

The body of this fish is diamond-shaped and very thin. It is of a silvery bluish color and is often marked with three curved vertical bands across the body. The dorsal and anal fins of this fish are developed into long thread-like streamers making a very interesting aquarium exhibit. It is an edible species, but is almost too beautiful and fascinating to be used as food.



Drawn from Jordan & Evermann

The thread fish is distributed from the coast of East Africa through the East Indies and the Hawaiian Islands to the Pacific coast of North America.

Pompano

83-31 *Seyris indica* Ruppell

This fish is silvery white in color over its body and is marked with darker areas and purplish reflections on its back.

It is found from the Red Sea eastward through the many islands of Melanesia and Polynesia as far as the Society Islands and the Hawaiian Islands.

THE CARDINAL FISH FAMILY

84 Family *Amiidae* (*Chilodipteridae*, *Apogonidae*)

The cardinal fishes are of a bright reddish color with large scales and usually two anal spines. They are small fishes and live among coral rocks or in deeper water. They are abundant in the East Indies and some are found in fresh water in that area. Although they are small, they are eaten as food in Japan; only the larger species were eaten by the Hawaiians.

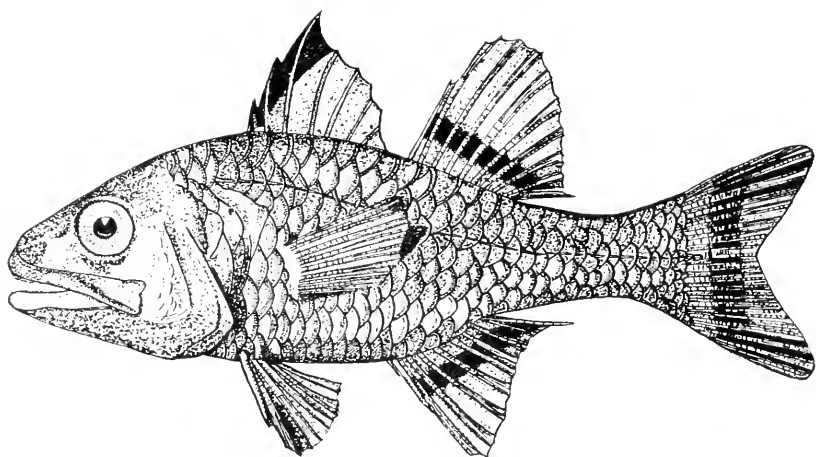
Of about 130 species, at least ten are known from the Hawaiian Islands.

Cardinal Fish or Upapalu

84-1 *Amia frenata* (Valenciennes)

Plate III, Figure 7

This cardinal fish is of a pale red to coppery-brown color and is marked with bands along the sides of the body. It is lighter beneath and



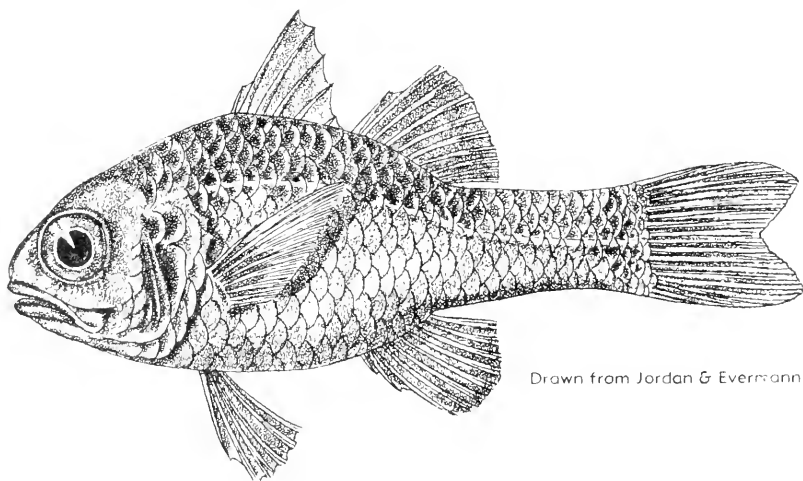
Drawn from Jordan & Evermann

is marked with silvery reflections on the opercle. The front half of the dorsal fin is dusky in color and the body is marked with two longitudinal lines. This fish measures about four inches in length.

This cardinal fish is found from Mauretius eastward through the East Indies and the islands of the south Pacific to Guam and Hawaii.

Cardinal Fish

84-2 *Amia erythrina* (Snyder)



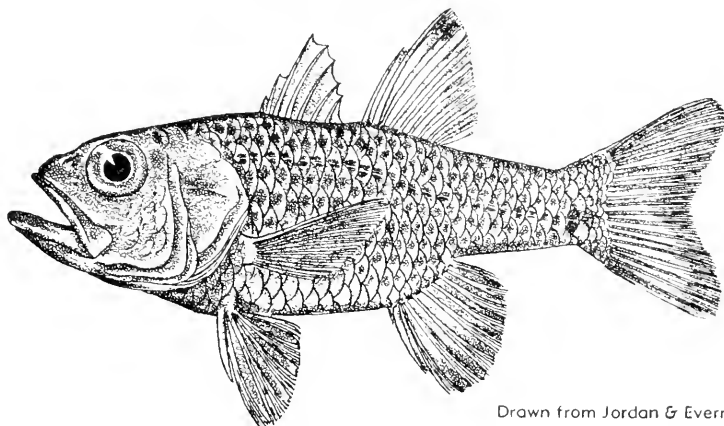
Drawn from Jordan & Evermann

This cardinal fish is bright reddish or reddish-orange in color and reaches a length of about two inches.

This species is distributed throughout southern Polynesia and the Hawaiian Archipelago.

Cardinal Fish or Upapalu

84-3 *Amia maculifera* (Garrett)



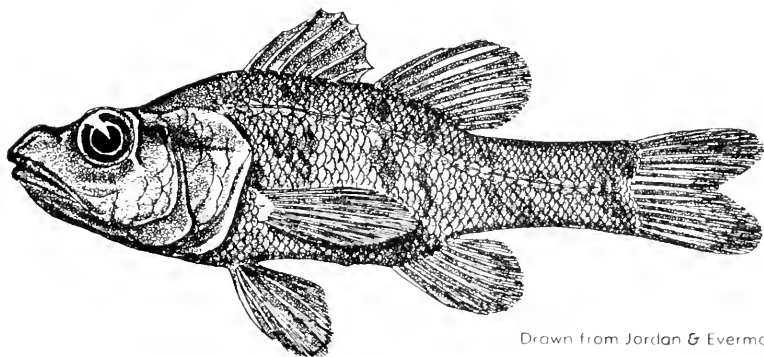
Drawn from Jordan & Evermann

This cardinal fish is of a pale purplish gray color above and a pale orange beneath. Its head is of a dusky reddish orange. It reaches a length of six inches and is found from the surface down to 65 fathoms.

This cardinal fish is found throughout the Hawaiian Archipelago.

Evermann's Cardinal Fish

84-4 *Amia evermanni* (Jordan & Snyder)

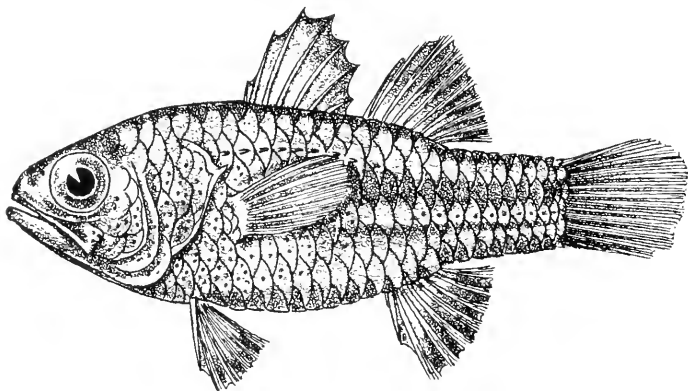


Drawn from Jordan & Evermann

This cardinal fish is reddish in color and measures about six inches in length. It is known only from the Hawaiian Islands. It was named for Barton Warren Evermann, ichthyologist with the United States Fish Commission.

Cardinal Fish

84-5 *Amia brachygramma* (Jenkins)



Drawn from Jordan & Evermann

This fish varies in color from a plain brown to a dusky brownish color in life. The young are marked with five vertical color bands which disappear with age. It lives about coral rocks from shallow water to depths of 73 fathoms and is abundant in some places. It is found in Samoa, the Hawaiian Islands, and possibly elsewhere.

Cardinal Fish

84-6 *Apogonichthys auritus* (Valenciennes)

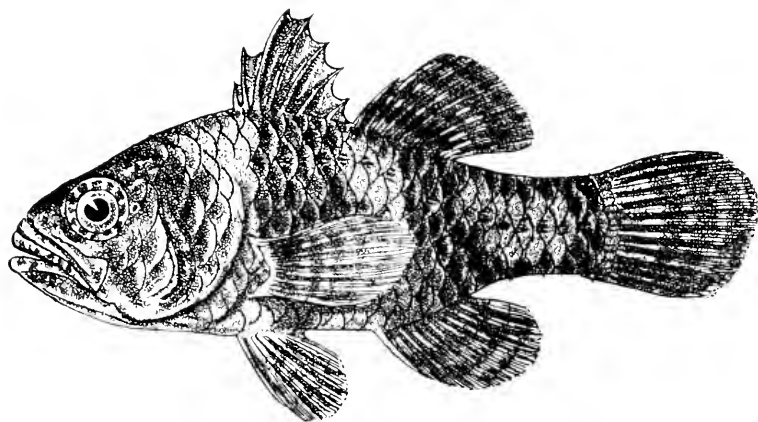
This cardinal fish is brown in color above and paler beneath. It is mottled with darker brown and contains a round, black blotch on the opercle. It reaches a length of twelve inches and is a shoreline species.

It is found from the Red Sea eastward through all of the Islands of the Pacific Ocean to Tahiti and the Hawaiian Islands.

Waikiki Cardinal Fish

84-7 *Mionorus waikiki* (Jordan & Evermann)

This cardinal fish has a short, stout, compressed body. It is dark brown on the head and body and is marked with three lighter bands

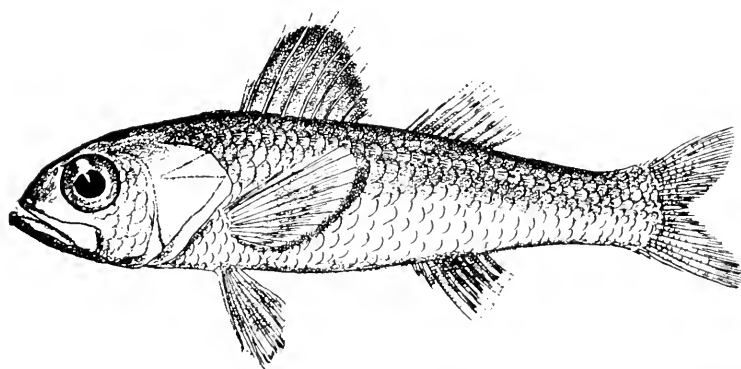


Drawn from Jordan & Evermann

around the body. It reaches a length of about two inches and lives among the coral rocks from shallow water to depths of over forty fathoms. It is found from the Hawaiian Islands to Guam and the Marshall Islands. It was first caught at Waikiki Beach on Oahu.

Japanese Cardinal Fish

84-8 *Synagrops japonica* (Steindachner & Doderlein)



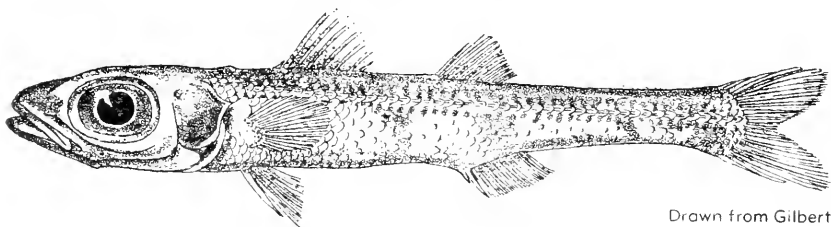
Drawn from Gilbert & Cramer

This cardinal fish is described as a deep umber-brown color with mauve tints above and dull silvery with brownish tints beneath. The fins are all brownish and the pectoral fin is pale in color. It is a rare species and has been taken between 122 and 290 fathoms.

It is known from the East Indies, Japan, Guam, and the Hawaiian Islands.

Cardinal Fish

84-9 *Hynnodus atherinoides* Gilbert

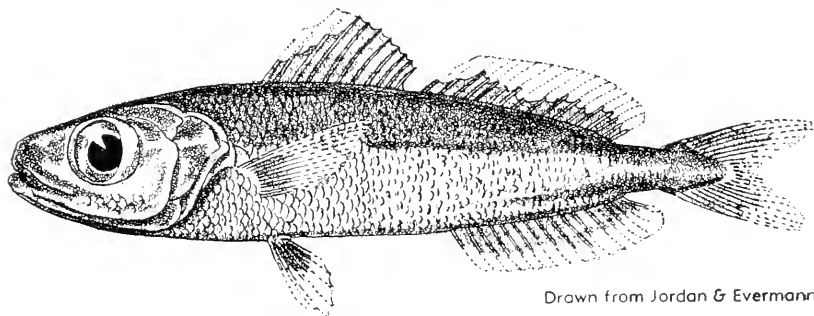


Drawn from Gilbert

This rare cardinal fish is a dark gray color and measures about two inches in length. It is a deep sea fish and is known only from the Hawaiian Islands where it was dredged between 284 and 290 fathoms.

Cardinal Fish

84-10 *Ariomma lurida* Jordan & Snyder



Drawn from Jordan & Evermann

This cardinal fish is dull in color and reaches a length of over eight inches. It is a rather rare fish in shallow waters and is known only from the Hawaiian Islands.

THE SUNFISH FAMILY

Including the Basses, Crappies, Sunfishes, and Pumpkin Seeds

85 *Family Centrarchidae*

The members of this family are peculiar to the fresh water streams of North America. They are all carnivorous, voracious, gamy, and valued as food. They breed in the spring of the year and usually build a nest which they guard with courage.

Of about thirty known species, one has been introduced into the Hawaiian Islands.

Large Mouth Black Bass or Straw Bass

85-1 *Micropterus salmoides* (Lacepede)

During the summer of 1897 the people of Hilo arranged for a shipment of fish from the California Fish and Game Commission. In October, ninety fish of an unidentified species of bass were shipped from San Francisco on a sailing packet. Of the fifty-five fishes which arrived at Hilo, thirty-four died because they were allowed to stand on deck for several days. The remaining twenty-one fishes were put into the Wailuke River near Rainbow Falls. The fishes were never seen again. They were either swept out to sea by a freshet or did not become established.

In 1908 Mr. W. A. Templeton while visiting in California brought some large mouth black bass from California to Hawaii to put them into the Wahiawa Reservoir on Oahu. They are now fairly well established in this stream.

THE MOUNTAIN BASS OR SESELE FAMILY

86 Family *Duleidae*

The fishes of this family are dull, somber, or silvery in color. They are nearly all shoreline fishes and seem to prefer to live in the fresh and brackish water about the mouths of rivers and even enter fresh water.

These fishes are especially abundant in the waters of the Southern seas from the eastern coast of Africa through the Indian Ocean and the Islands of the East Indies, along the northern coast of Australia, and through the many island groups of Polynesia.

Of nine species inhabiting the Pacific Ocean, five are known from the Hawaiian Islands.

Salele

86-1 *Dules rupestris* (Lacepede)

This fish, called the Salele by the Samoans, is silvery bronze in color and is mottled with olive green. It reaches a length of about ten inches.

A swift swimming fish of rock pools and river mouths it is distributed from the eastern coast of Africa eastward to Tahiti and the Tuamotus and northward to the Hawaiian Islands.

Aholehole or Mountain Bass

Also known as the Ahole

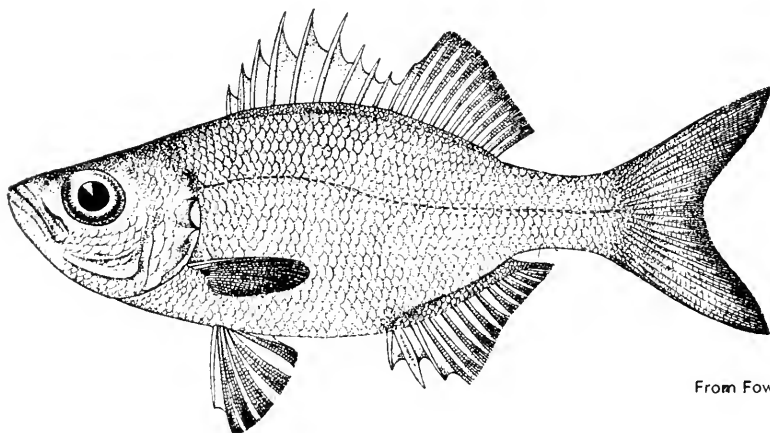
86-2 *Dules marginatus* Cuvier

The aholehole is a bright silvery bluish color on the body and reaches a length of ten inches. It is an attractive little fish and lives in great numbers in the brackish water and streams of its range. These fishes spawn along the shorelines and the young after hatching spend about three years living among the coral pools. Here they are safe from their enemies and are able to make a rapid growth because of the large quantities of food in these areas. They obtain their characteristic color at the end of the second year and soon thereafter leave the coral pools to begin life along the open coastline.

The aholehole bites a hook readily and is a good little game fish. Although small, it is a good food fish. This fish is distributed from the East Indies and Micronesia eastward through the islands of Polynesia and northward to the Hawaiian Islands.

Bonin Island Sea Bass

86-3 *Dules boninensis* (Fowler)



This little sea bass measured about nine inches in length and was taken a few hundred miles northwest of the Hawaiian Islands.

Aholehole

Also known as the Pua-Aholehole (young)

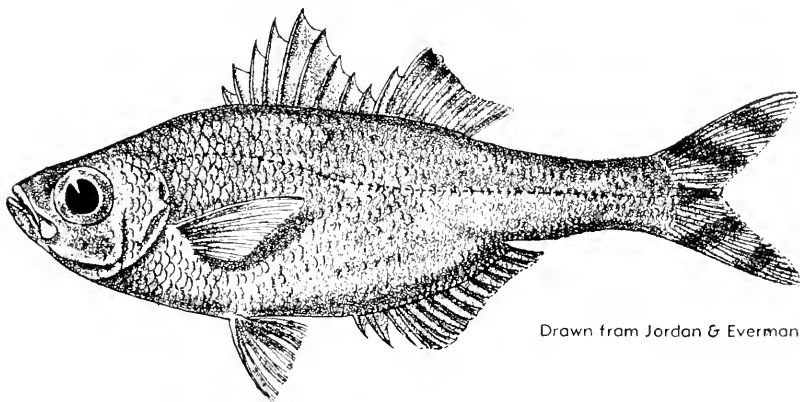
86-4 *Dules sandvichensis* (Steindachner)

This fish is silvery gray in color above, silvery white beneath, and reaches a length of nine inches. This species is distributed throughout the islands of Melanesia and Polynesia as far north as the Hawaiian Islands. They are common in tide pools, streams, and estuaries and from there find their way into island markets.

It is interesting to note that the first haoles or white people to come to the Hawaiian Islands were called aholehole because of their pale color.

Saboti

86-5 *Dules taeniura* (Cuvier)



Drawn from Jordan & Evermann

This fish, called Saboti by the Samoans, is readily recognized by its large size, its silvery color, and by the five cross bands on the caudal fin. It reaches a length of at least nine inches.

This species makes its home among the lava rocks and is common in this habitat throughout Polynesia. It is known from the eastern coast of Africa through all of the warm waters and islands eastward to the Revillagigedo Islands of the western coast of Mexico. It is known from Johnston Island and the Hawaiian Islands.

THE SEA BASS FAMILY

Including the Sea Perch, Groupers, Tattlers, and Barbers

87 *Family Serranidae*

The family of the sea bass is a large family of carnivorous, marine fishes. The smaller members can change their color rapidly and have

therefore been called "Chameleons of the Sea." They nearly all live in warm or temperate seas, but a few genera do ascend fresh water.

Of more than 400 known species in this family fifteen have been recorded from the Hawaiian Islands.

Thompson's Sea Bass

87-1 *Stereolepoides thompsoni* Fowler

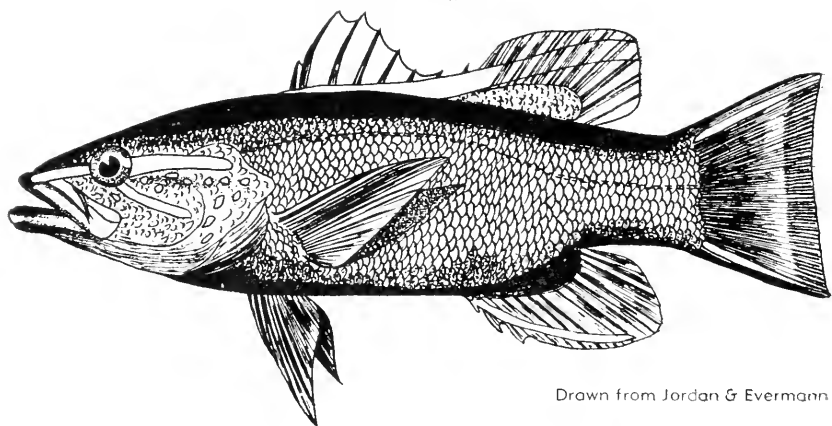
This fish is known only from a head which was obtained in a Honolulu fish market. The head alone measured about two feet in length and is preserved in the Bishop Museum.

Japanese Bass

Also known as Susuki or Uu

87-2 *Pikea japonica* Steindachner & Doderlein

Plate IV, Figure 2



Drawn from Jordan & Evermann

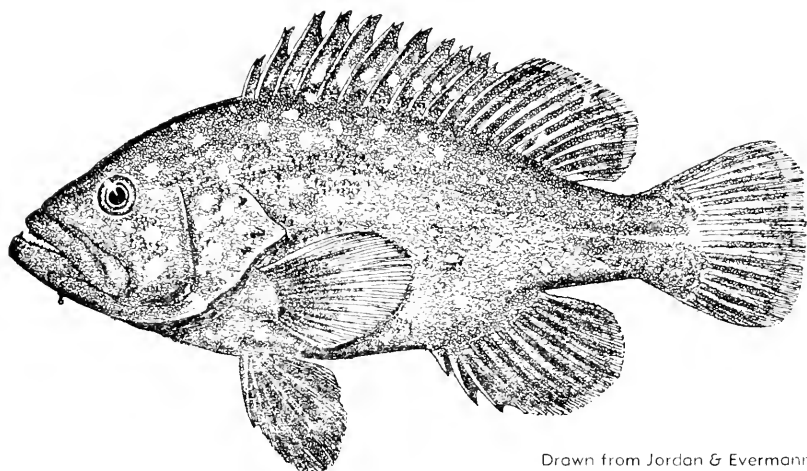
This fish is a pale rosy color above and whitish beneath. It is marked with a yellow stripe through the eye, a horizontal stripe through the dorsal and anal fins, and a single stripe at both the top and the bottom of the tail. It reaches a length of at least eight inches. It is one of the most valued food fishes of Japan and is found in Japanese and Hawaiian waters.

Sea Bass

87-3 *Serranus dictiophorus* Bleeker

This fish measures over one foot in length and is marked by four or five faint cross bands on the body. The head and the body are covered with small orange and red spots and are separated by a network of lines.

Hapuu

87-4 *Serranus quernus* (Seale)

Drawn from Jordan & Evermann

This fish is of a uniform dark purplish brown color and measures from two to three feet in length. It is a scarce item on fish markets and is known only from the Hawaiian Islands.

Grouper

87-5 *Serranus septemfasciatus* (Thunberg)

This grouper is of a pale uniform brownish color in alcohol, is without markings, and measures at least six inches in length. It is known from the warmer waters of the Atlantic, Indian, and Pacific Oceans.

Indian Grouper

Also known as the Rock Fish or Jew Fish

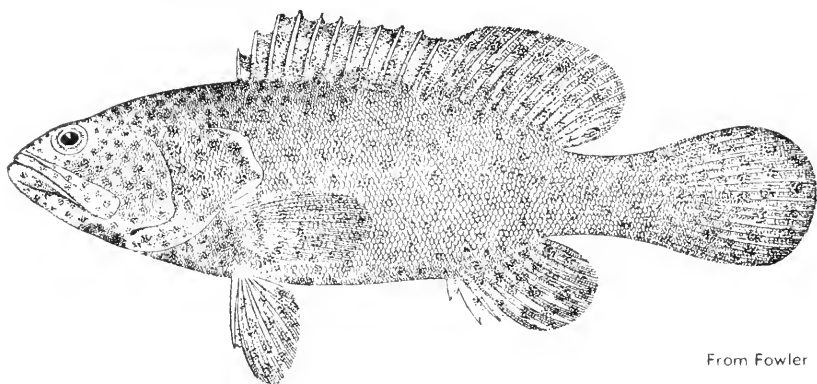
87-6 *Serranus lanceolatus* (Bloch)

The young specimens of this fish are yellowish in color and are marked with about four dark brown crossbands on the body. As they grow older they deepen to a uniform brown color. The largest of the groupers, they reach a length of five, six, and even twelve feet and weigh from 400 to 500 pounds.

This fish is found from the eastern coast of Africa eastward through the East Indies to the Hawaiian Islands.

Variegated Rock Cod or Malabar Grouper

87-7 *Serranus tauvina* (Forsk.)



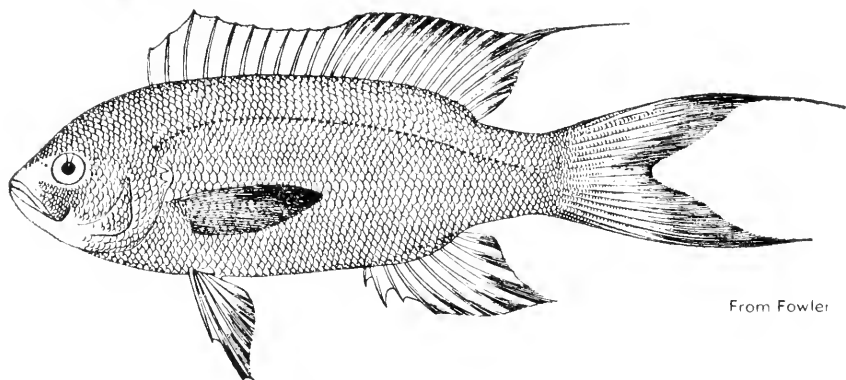
From Fowler

This fish is brownish in color, is marbled with spots, and is marked on the back with six saddle-shaped blotches. The fins are all marked with a narrow white margin. The fish reaches a length of four feet.

This fish is found from the Red Sea and the coast of Africa eastward through the Indian Ocean and the islands of the East Indies as far as the Hawaiian Islands.

Thompson's Sea Bass

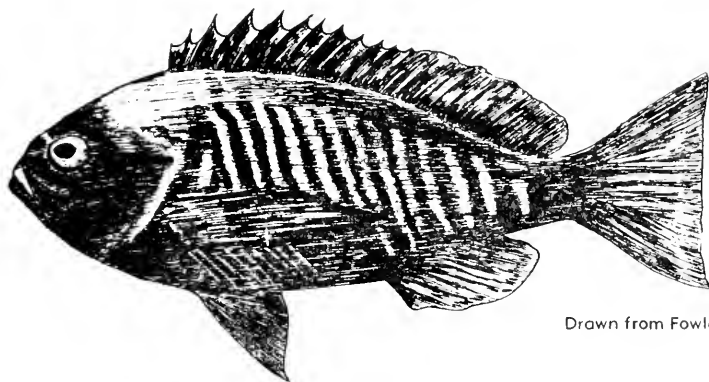
87-8 *Caesioperca thompsoni* Fowler



From Fowler

This fish is of a uniform rosy pink color and is marked with yellowish fins. It reaches a length of eight inches and is known from only a single specimen taken at Honolulu.

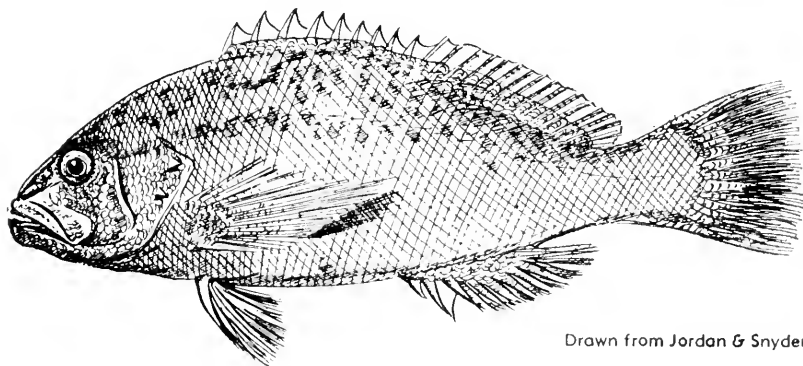
Sea Bass

87-9 *Caprodon longimanus* (Gunther)

Drawn from Fowler

This fish is pink in color and is marked with yellow spots in irregular stripes. There are also two yellow stripes in front of the eye. The fish reaches a length of at least one and one-half feet and is known from the South Pacific and the Hawaiian Islands.

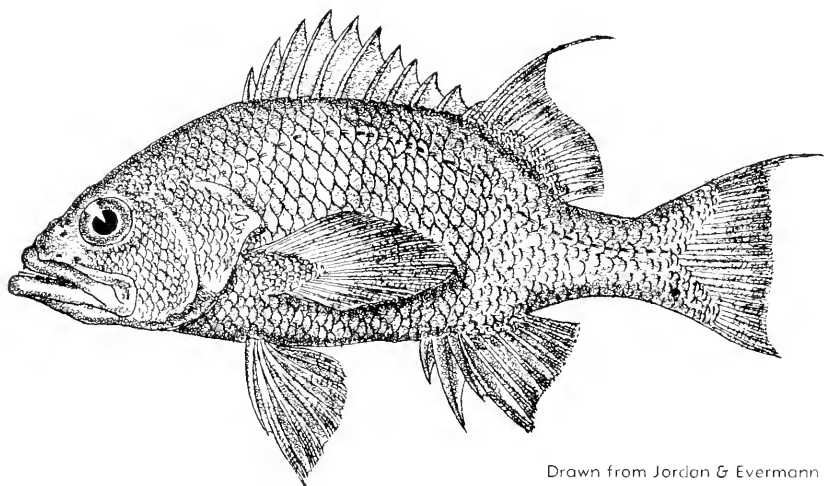
Schlegel's Sea Bass

87-10 *Caprodon schlegelii* (Gunther)

Drawn from Jordan & Snyder

This fish is crimson in color and is marked with yellow. It has two yellow stripes in front of the eye, and another yellow stripe running from the eye to the pectoral fin. It measures at least fifteen inches in length and is found in Japan and in the Hawaiian Islands.

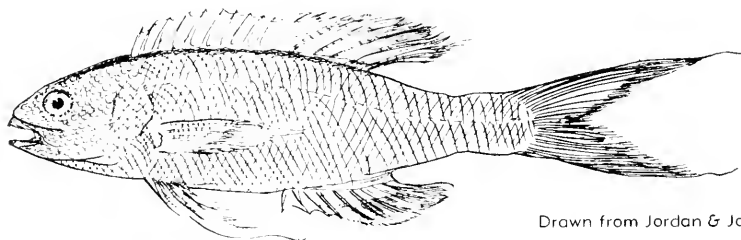
Kellogg's Sea Bass

87-11 *Anthias kelloggi* Jordan & Evermann

Drawn from Jordan & Evermann

This fish is of a reddish color in life and has yellowish fins. It is darker in color on the head and reaches a length of at least ten inches. It is caught on hooks in deep water and is known only from the Hawaiian Islands.

Sea Bass

87-12 *Symphysanodon typus* Bleeker

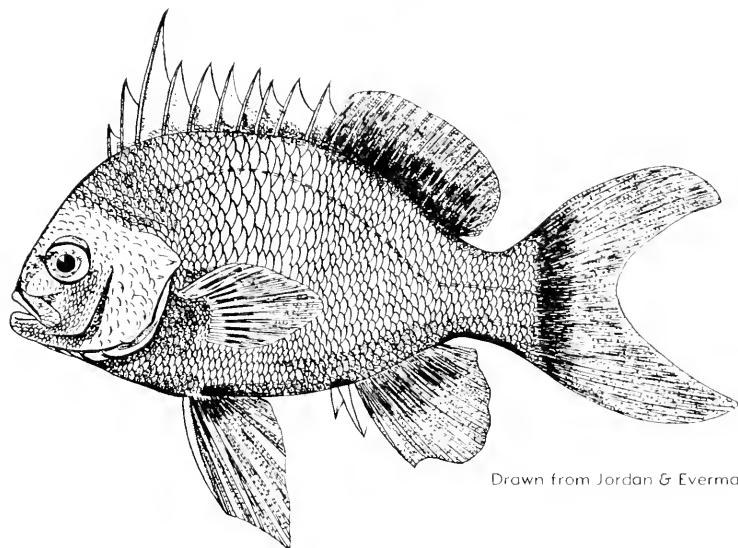
Drawn from Jordan & Jordan

This fish is reddish in color in life and measures at least three inches. It is known from the East Indies and the Hawaiian Islands.

Sea Bass

87-13 *Odontanthias fuscipinnis* (Jenkins)

Plate IV, Figure 1

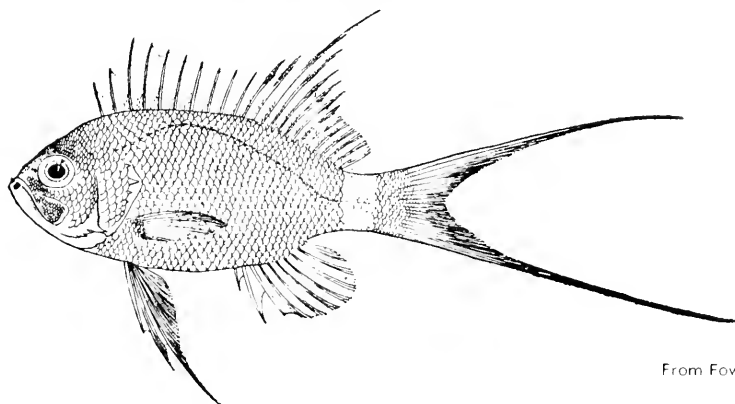


Drawn from Jordan & Evermann

This fish is golden to orange color above and whitish beneath. It measures at least ten inches in length and is taken from deep water. It is known only from the Hawaiian Islands.

Sea Bass

87-14 *Odontanthias elizabethae* Fowler

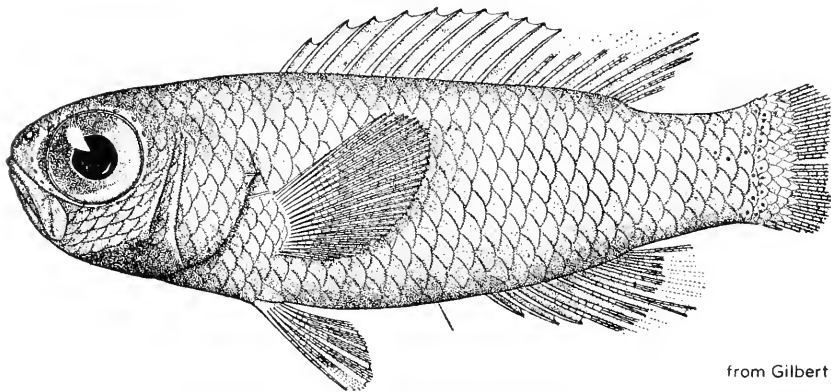


From Fowler

This fish is a brilliant reddish color in life. It measures about eight inches in length. It is known only from the Hawaiian Islands.

Sea Bass

87-15 *Grammatonotus laysanus* Gilbert



from Gilbert

This fish is light purplish-red in color above, silvery beneath, and measures about two inches in length. It is known from a single specimen taken near Laysan Island between 97 and 199 fathoms.

THE PSEUDOCROMID FAMILY

88 *Family Pseudochromidae*

The fishes of this family are all marine and live in the tropics. They may be recognized by the fact that they have but a single dorsal fin and have the lateral line interrupted.

Only one member of this family is known from the Hawaiian Islands.

Pseudochromid

88-1 *Pseudochromis polyacanthus* Bleeker

This fish reaches a length of at least three inches. It is found from the East Indies through Polynesia and extends as far northward as the Hawaiian Islands.

THE BIG EYE FISH FAMILY

Also known as the Catalufa, Red Fish and Blear Eyes

89 *Family Priacanthidae*

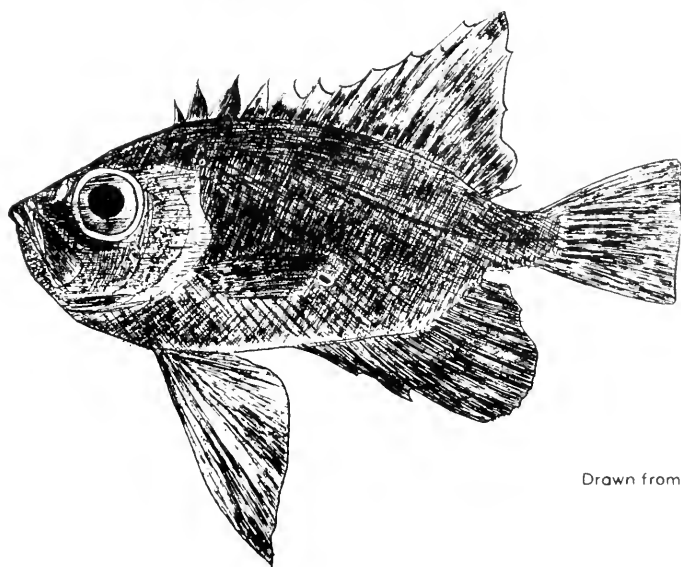
The fishes of this family are usually a handsome rose color or are bright reddish in color. Their bodies are short and flattened, the scales are rough, the eyes are large, and the mouth is obliquely placed.

They are a group of carnivorous fishes and seem to prefer to live in deep water. They are widely distributed in tropical seas.

Of about ten species in the family, at least four are known from the Hawaiian Islands.

Big Eye

89-1 *Priacanthus hoops* (Schneider)



Drawn from Fowler

This fish is reddish in color in life and measures about fifteen inches in length.

It is widely distributed and ranges through the South Atlantic, Indian, and western Pacific Oceans as far as the Hawaiian Islands.

Aweoweo or Redfish

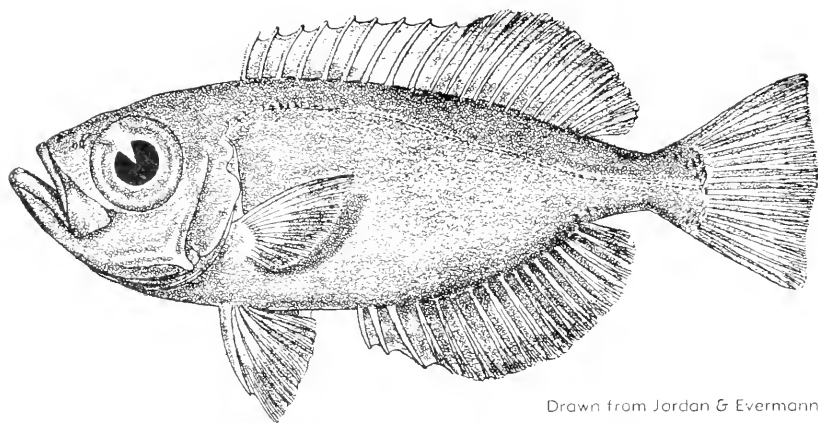
Also known as the Big Eye, Ojudo, and Alalauwa (young)

89-2 *Priacanthus cruentatus* (Lacepede)

Plate IV, Figure 9

The Aweoweo or redfish varies from a light reddish to a silvery color and is mottled on the sides. The lower surface of the body is rosy in color. The young have the caudal fin black edged and travel about in schools. This fish reaches twelve inches in length.

The species is circumtropical in its distribution and occasionally appears in large schools.

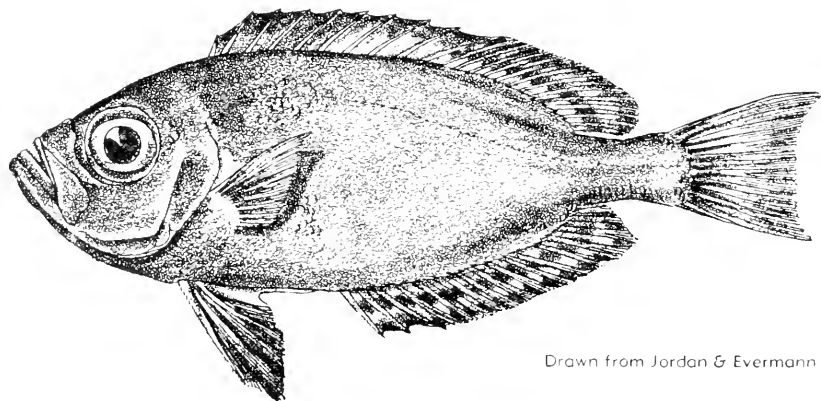


Drawn from Jordan & Evermann

Dr. Streets says that "During the month of September, 1873, an immense school of the young of this species entered the harbor of Honolulu. The largest of them did not exceed three and one-half inches in length. This schooling, we were told, has occurred a number of times, but at certain intervals. The coming of the 'red-fish,' as they are called, foreshadows in the minds of the simple natives the sickness and death of some member of the royal family; and, on account of the plaint disposition of the kanakas, the prophecy is usually fulfilled. But the fish are by no means unwelcome visitants to the common people, who are busy catching them night and day as long as they remain. They are dried and eaten without cooking."

Ula or Alalauwa

89-3 *Priacanthus macrocantus* Cuvier



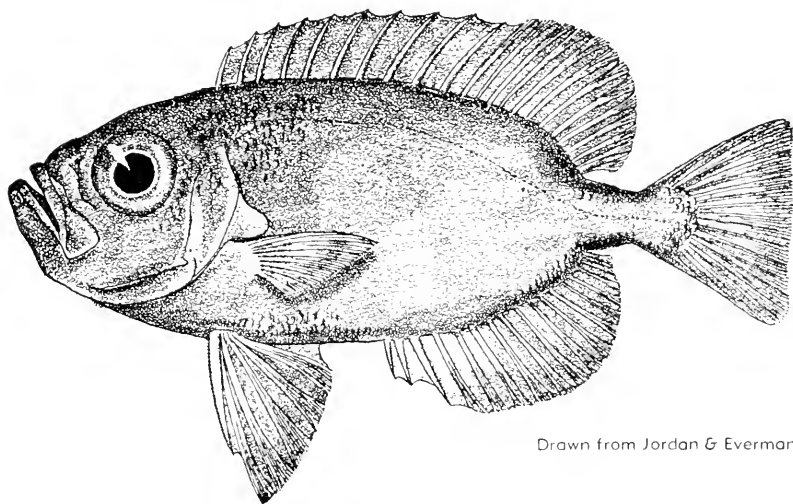
Drawn from Jordan & Evermann

This fish is a deep red color in life and reaches a length of twelve inches. It is an important food fish in Honolulu markets and is quite abundant.

It is distributed from the East Indies to Australia, Japan, and the Hawaiian Islands.

Alalauwa

89-4 *Priacanthus hamrur* (Forsk.)



Drawn from Jordan & Evermann

This fish is a light silvery olive color above and reaches a length of twelve inches. It is occasionally seen in the Hawaiian Island markets.

It is distributed from the Red Sea and Zanzibar eastward through the East Indies to Japan and the Hawaiian Islands.

THE SNAPPER FISH FAMILY

Including the Pargos and the so-called Bass of Australia

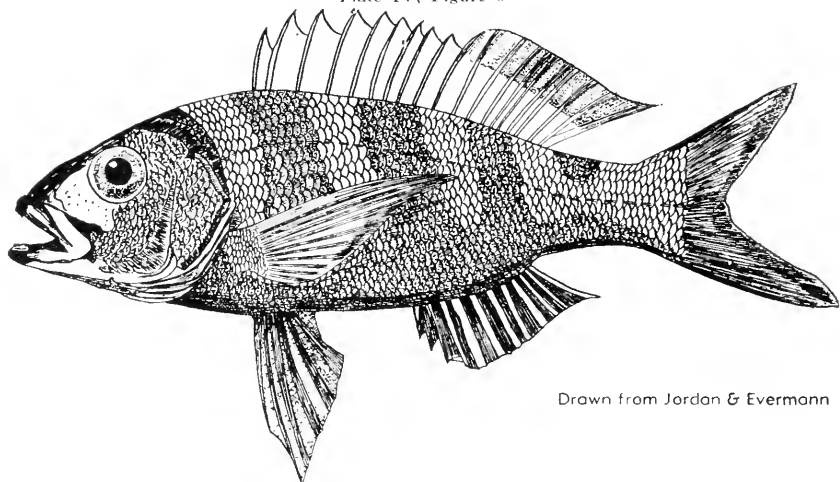
90 Family *Lutjanidae* (*Lutjanidae*)

The members of the snapper family are nearly all rather large and brilliant fishes. They are active, carnivorous, voracious, and gamy and inhabit the shorelines of warm seas. Their abundance and their white, flaky flesh makes them a good food fish. They are a large and important family and include about 250 different species. Of this number at least ten are known from the Hawaiian Islands.

Ukiki or Ulaula

90-1 *Tropidinus zonatus* (Valenciennes)

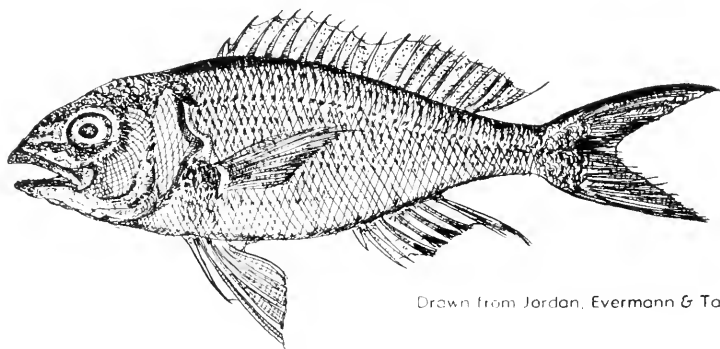
Plate IV, Figure 6



Drawn from Jordan & Evermann

This fish is reddish and yellow above. It is marked with three yellow bands extending onto the body and one onto the tail. The remainder of the body is reddish in color. It reaches a length of twenty inches and seems to inhabit deeper water. It is a good food fish although it is not abundant. It is known from Mauritius and the Hawaiian Islands.

Snapper

90-2 *Pristipomoides microlepis* (Bleeker)

Drawn from Jordan, Evermann & Tanaka

This snapper is a mixed golden and gray-blue color over its body. The dorsal and pectoral fins are yellow, while the anal fin is white. The

caudal fin is yellow with a bluish gray border. It is known from Mauretius and the Hawaiian Islands.

Opakapaka

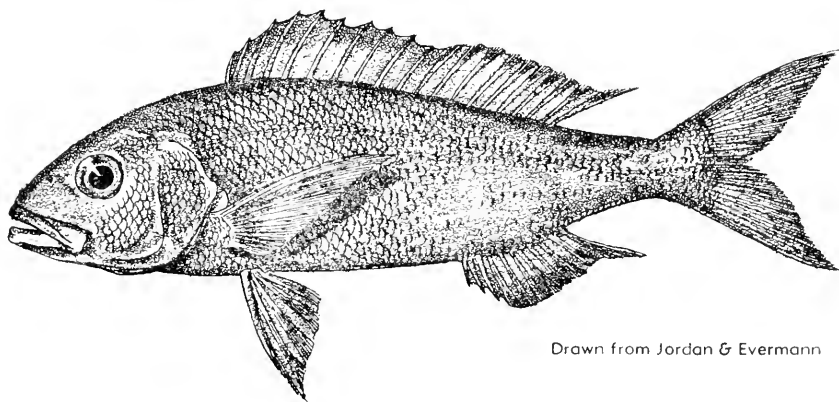
Also known as the Ulaula, Koae (large), and Weke Koae (adult)

90-3 *Pristipomoides filamentosus* (Valenciennes)

The Opakapaka is violet brown on the back and sides and silvery beneath. It reaches a length of two or more feet and is one of the common food fishes in the Hawaiian Islands. It is known from southern Japan and the Hawaiian Islands.

Opakapaka or Snapper

90-4 *Pristipomoides microdon* (Steindachner)



Drawn from Jordan & Evermann

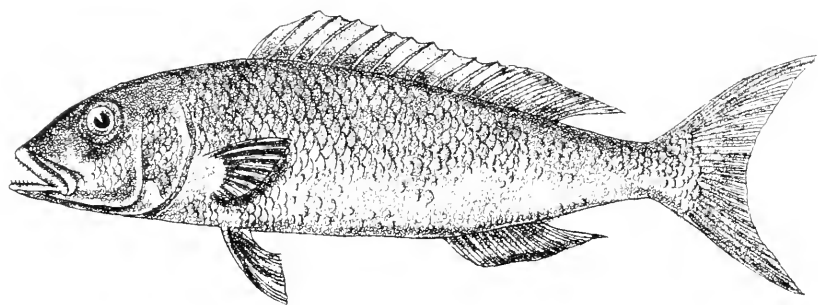
This fish is light rosy olive in color above and paler beneath. It reaches a length of two feet and is an important food fish in Island markets. It is found among all of the Hawaiian Islands.

Uku or Snapper

Also known as the Uku-palu

90-5 *Aprion virescens* Valenciennes

The uku is of a uniform light gray color and is tinged with blue. The lower surface is lighter in color. This fish reaches a length of over two feet, is common in Island markets, and is one of our best food fishes.



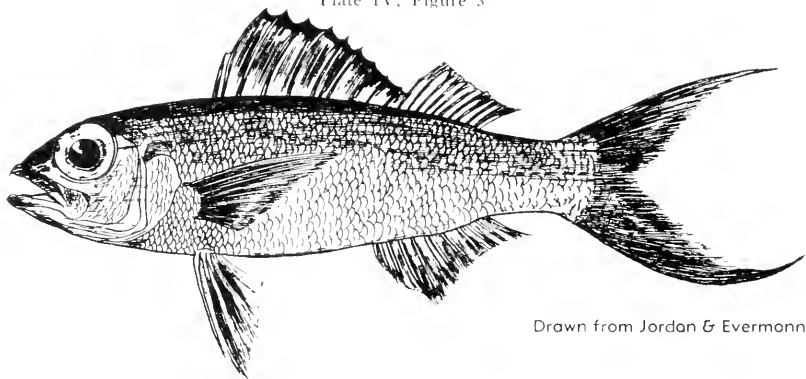
Drawn from Jordan & Evermann

The uku is found from the Seychelles through the East Indies to the Hawaiian Islands.

Ulaula

90-6 *Etelis carbunculus* Cuvier

Plate IV, Figure 3



Drawn from Jordan & Evermann

The Hawaiian name of this fish means very red, and true to its name it is a brilliant rose red color above and silvery on the sides. It is a very handsome fish and reaches a length of eighteen inches. It is common in our local markets during the winter months.

The ulaula is found in the tropical Atlantic Ocean and from Mauritius to the East Indies, Japan, and the Hawaiian Islands.

Ulaula or Snapper

90-7 *Etelis marshi* (Jenkins)

Plate IV, Figure 4

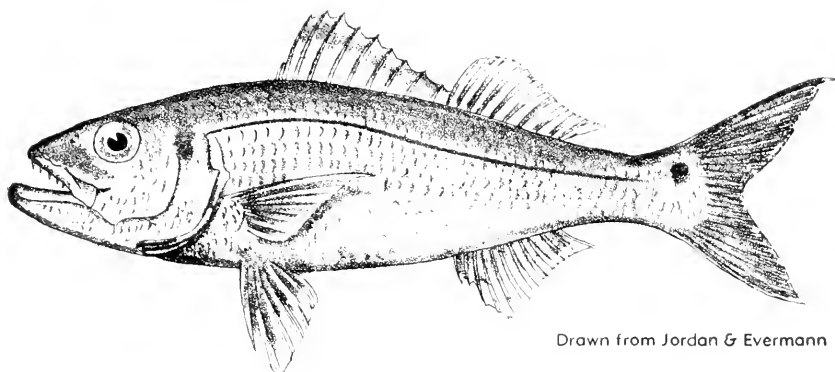
The ulaula is a rose red color in life and is marked with a golden stripe along the lateral line. It reaches a length of two feet and is common in deep water. Since adult specimens are full of eggs in the

Plate V



1. *Lauwiliwili Nakunuku Oene*
2. *Kapubili*
3. *Caproid Fish*
4. *Lauwiliwili*
5. *Kikakapu*
6. *Kikakapu*

7. *Lauban*
8. *Kikakapu*
9. *Kikakapu*
10. *Angel Fish*
11. *Long Finned Butterfly Fish*
12. *Kikakapu*

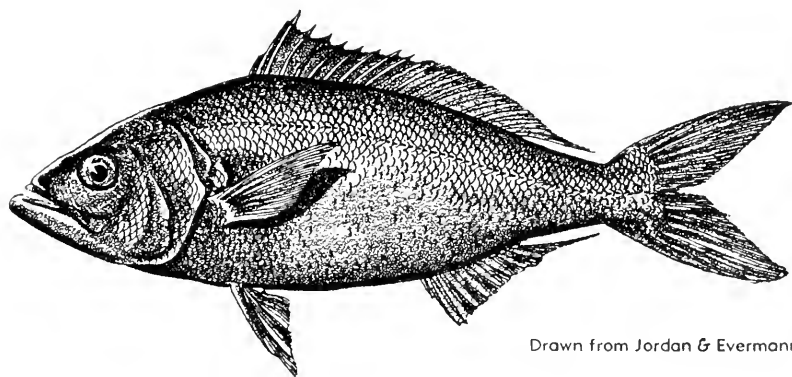


Drawn from Jordan & Evermann

summer, they apparently spawn at that season. This species is distributed throughout the Hawaiian Island chain and doubtless extends into adjoining waters.

Snapper

90-8 *Aphareus furcatus* (Lacepede)



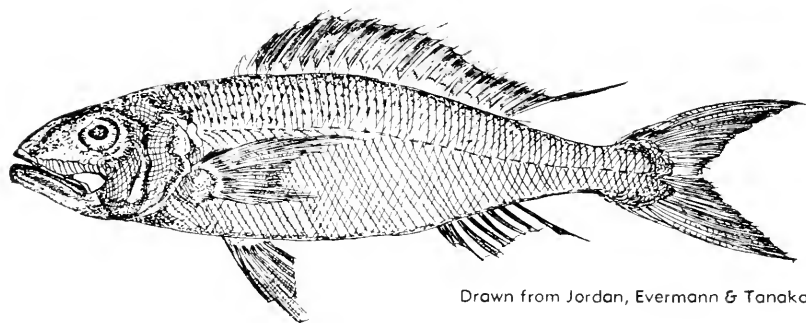
Drawn from Jordan & Evermann

This snapper is of a dirty violet-blue-gray color above and changes to silvery on the lower surface. It reaches a length of fifteen inches. The flesh of the fish is soft and of good flavor, but unfortunately the fish is not common about the Hawaiian Islands.

This snapper is distributed from Micronesia through Polyensia to the Hawaiian Islands.

Snapper

90-9 *Aphareus rutilans* Cuvier



Drawn from Jordan, Evermann & Tanaka

This snapper is a dull pinkish color above and silvery beneath. The top of the head and the fins are red, while the dorsal fin has a yellow edge. It reaches a length of thirty inches and will weigh about twenty pounds.

It is known from the Red Sea, New Guinea, and the Hawaiian Islands.

Snapper

90-10 *Terapon jarbua* (Forsk.)

This snapper is known from the Red Sea and Zanzibar eastward through the Indian Ocean, the East Indies, along the coast of China and northern Australia, through Melanesia, and the islands of Polyensia as far as the Hawaiian Islands.

Only one specimen, however, has been recorded from the Hawaiian Islands.

THE LETHRINID FAMILY

91 Family *Lethrinidae*

The members of this family look very much like snappers in both form and color. Although one species ranges into the eastern Atlantic, they are an Indo-Pacific group and extend along the coast of Japan and throughout Polynesia.

Only one member of this family has ever been recorded from the Hawaiian Islands.

Lethrinid

91-1 *Lethrinus lentjanus* (Lacepede)

This fish is undoubtedly reddish in life and measures at least sixteen inches in length. It is known from the East Indies, Micronesia, and the Hawaiian Islands.

THE PORGY FAMILY

Including the Porgies, Pargos, and Breams of Australia

92 Family Sparidae

The members of this family of fishes are all elevated in form with oblong bodies. They are a large family of carnivorous, shore fishes of the tropical seas and are especially abundant in the Mediterranean Sea, Red Sea, and the West Indies. They are good food fishes.

Of over 100 known species, only two are recorded from the Hawaiian Islands.

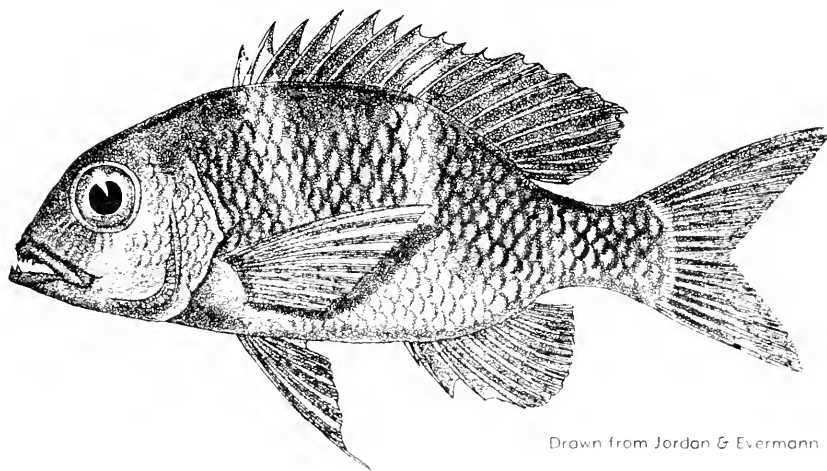
Red Tai or Akadai

92-1 *Chrysophrys major* Schlegel

This fish is a crimson color above and lighter beneath. It reaches a length of ten inches and is a good food fish. Since the flesh of this fish is tender and of good flavor, it is one of the favorite food fishes of Japan. Ebisu, the Japanese fish god, always carries this fish under his arm as his emblem.

This fish is found from China, Japan, Australia, and New Zealand to the Hawaiian Islands.

Mu or Mamamu

92-2 *Monotaxis grandoculis* (Forsk.)

Drawn from Jordan & Evermann

The mu is an olive gray or greenish color above, silvery beneath, and is marked with the traces of four stripes across the body. A fairly abundant

species, it reaches a length of over twenty inches. It is valued as food in the islands of the Pacific Ocean and commands a high price.

The mu is widely distributed and is found from the Red Sea eastward through the Indian Ocean, the East Indies, Melanesia, Micronesia, and Polynesia to the Hawaiian Islands.

THE RUDDER FISH FAMILY

Including the Pilot Fish, the Chubs, the Chopas, and the Drummers

93 Family *Kyphosidae*

The members of this family are usually dull in color and herbivorous in their habits. They live along the shore and feed largely on green and olive algae. They are valued as food and inhabit the warm seas of the world, principally the Mediterranean Sea and the Pacific Ocean.

The family is a fairly large one and includes about seventy species, of which at least four are known from the Hawaiian Islands.

Chopa

93-1 *Kyphosus bigibbus* Lacepede

This porgy is found in Melanesia, Micronesia, and the Hawaiian Archipelago.

Chopa

93-2 *Kyphosus lembus* (Cuvier)

This rudder fish is silvery in color and is marked with indistinct dusky streaks along the back and by two blue streaks below the eyes.

It is known from Zanzibar through the East Indies and Melanesia to the Hawaiian Islands.

Nanue or Chopa

Also known as the Nanue Paiai or Manalo

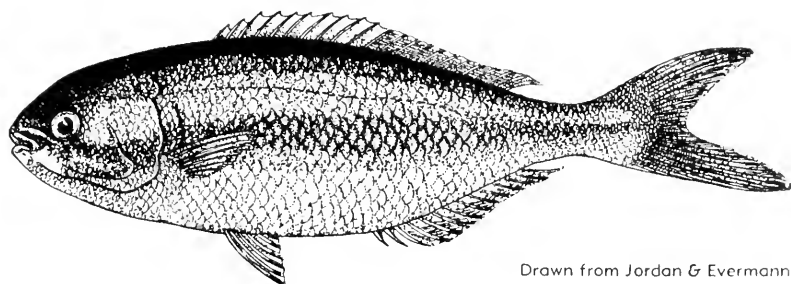
93-3 *Kyphosus fuscus* (Lacepede)

This rudder fish varies widely in color. It is usually a grayish silver-blue color above and a pale silvery-blue color beneath. The body is sometimes marked with yellowish green stripes. The fish has a small head, is roundish in shape, is rather thin, has a small mouth and fins, and possesses a thick, heavy tail. It reaches a length of two feet. It is a good food fish and is found in all tropical and semi-tropical seas.

Azure Chopa

93-4 *Sectator azureus* Jordan & Evermann

Plate III, Figure 8



Drawn from Jordan & Evermann

This rudder fish is steel blue in color on the back and has yellowish sides with a long, blue stripe running through it. The lower surface of the body is whitish. It reaches a length of fifteen inches.

This fish is known from a single specimen taken near Heeia, Oahu. It is a rare fish even to old fishermen.

THE BOAR FISH FAMILY

94 *Family Histiopteridae*

The members of the family of the boar fishes all have strong spines and rough scales. They all inhabit salt water and live at some depth. They are most numerous about the islands of Japan.

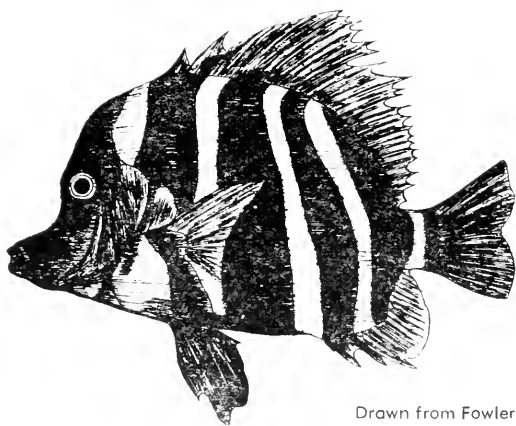
Only one species is known from the Hawaiian Islands.

Boar Fish or Matodai

94-1 *Histiopertus typus* Schlegel

This fish was described as a pale brown color in alcohol and as having several broad brownish cross bands on the body. It measured about fifteen inches in length. It had an unusually deep body and high spines.

It is known from Japan, Duke of York Island, and the Hawaiian Islands.



Drawn from Fowler

THE EMMELICHTHYID FISH FAMILY

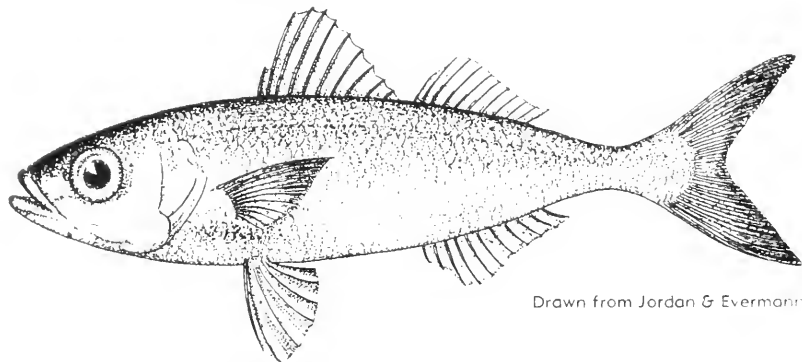
95 Family *Emmelichthyidae* (*Erythrichthyidae*)

The members of this family of fishes are mostly red in color and are very graceful in form. They are medium sized fishes and found in the West Indies and in various parts of the Pacific Ocean.

A small family, they have but a single representative in Hawaiian waters.

Schlegel's Fish

95-1 *Erythrocles schlegeli* (Richardson)



Drawn from Jordan & Evermann

This fish is yellowish above and pinkish beneath and reaches a foot in length. It is not a common fish and all the known specimens have been taken from deep water off Hilo, Hawaii.

It is known from Japan and the Hawaiian Islands.

GREGORY'S FISH FAMILY

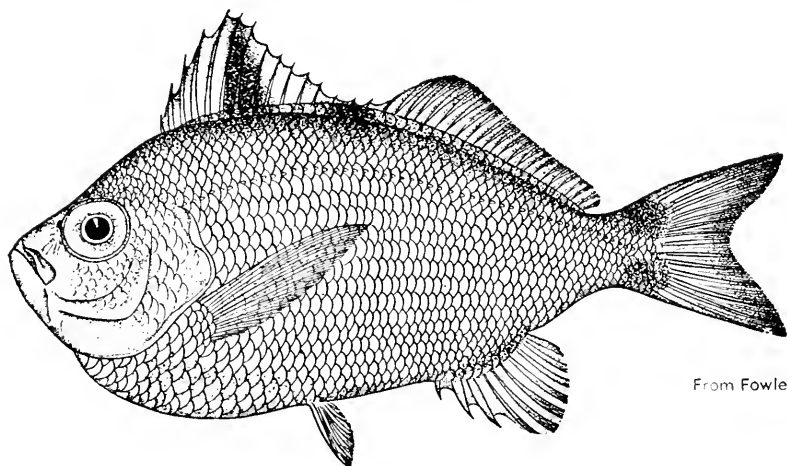
96 Family *Gregoryinidae*

This small family of fishes was named for Dr. Herbert Gregory of the Bernice P. Bishop Museum in Honolulu.

A single member of this family is known from the Hawaiian Islands.

Gregory Fish

96-1 *Gregoryina gygis* Fowler & Ball



Only one specimen of this fish is known to science. It was taken near Laysan Island in Hawaii's leeward chain.

THE OPLEGNATHID FISH FAMILY

97 Family *Oplegnathidae*

This is a small family of fishes of which only one representative is known from the Hawaiian Islands.

Oplegnathid Fish

97-1 *Oplegnathus fasciatus* (Schlegel)

This fish was described as a gray violet color in alcohol and measured sixteen inches in length

It has been recorded from both Japan and the Hawaiian Islands.

THE GOATFISH, SURMULLET OR RED MULLET FISH FAMILY

98 *Family Mullidae*

The members of the goatfish family are easily recognized by their bright red or golden color and by the barbels, usually golden in color, which ornament their chins. They are fishes of moderate size, small mouths, and large scales. They are nearly all marked with an under layer of red which appears when the fish is scaled or is put into alcohol. The species are all very much alike in appearance and are a little difficult to distinguish.

In general, most of these fishes feed on small animals which they find on shallow bottoms. In searching for food they use the barbels to feel along the bottom. They are carnivorous fishes but they are not at all voracious in their habits and they are consequently often the victims of predacious fishes which feed upon them.

The goatfishes are found along the shorelines of all of the tropical seas. Some of the species stray northward, but only a few species are found outside of the tropics.

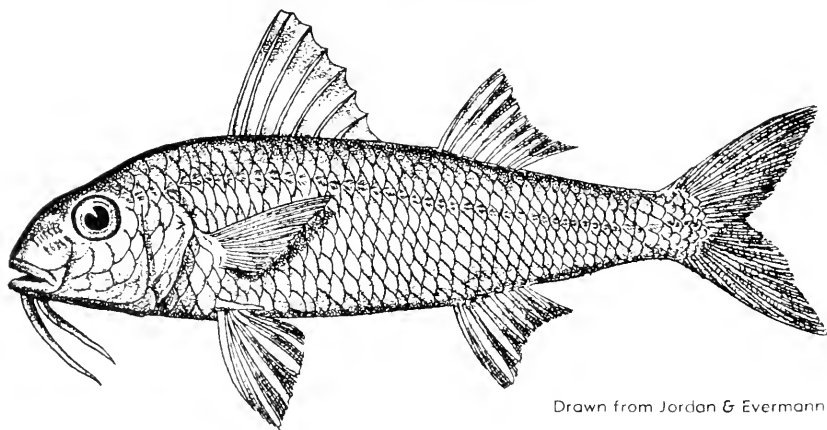
They are highly valued for food because of their white tender flesh and superior flavor. Their color makes them a very interesting market fish.

Of about forty known species, at least twenty are known from the Hawaiian Islands.

Weke

Also known as the Weke Ula or Weke Ahulu

98-1 *Mulloidichthys auriflamma* (Forsk.)



Drawn from Jordan & Evermann

This goatfish is a rich red color over the upper part of the body and is light in color on the lower surface. It is marked with a pale yellow band on the side of the body. Large specimens will reach a length of fifteen inches. It is a common market fish and may be taken inside of the reefs.

This species is found from the Red Sea eastward through the Indian Ocean, the East Indies, Melanesia, Micronesia, and Polynesia to the Hawaiian Islands.

Goatfish

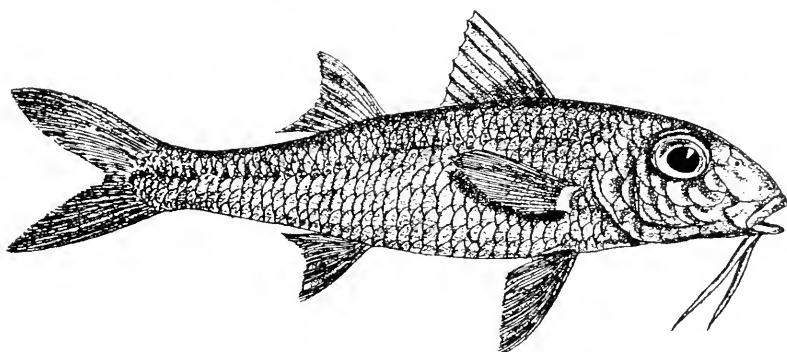
98-2 *Mulloidichthys erythrinus* (Klunzinger)

This fish resembles the preceding species in many respects, but it has larger scales. It is found in the Red Sea and throughout Polynesia as far as the Hawaiian Islands.

Weke

Also known as the Weke Ula Ula or Weke Aa

98-3 *Mulloidichthys samoensis* (Gunther)



Drawn from Jordan & Evermann

This goatfish is a bright red color in life and is marked with a tinge of yellow on the fins. The species seems to vary somewhat in color for some individuals seem to have a tinge of greenish. It will reach a length of about fifteen inches and is abundant in bays and lagoons about the Hawaiian Islands.

This fish is known throughout the islands of Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

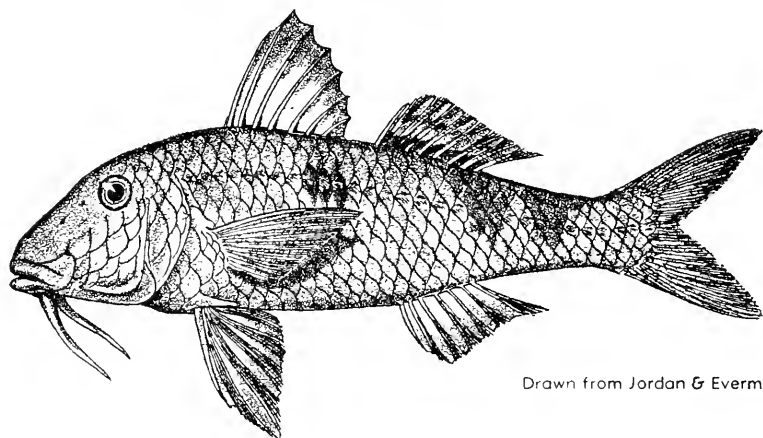
Pfluger's Goatfish

98-4 *Mulloidichthys pflugeri* (Steindachner)

The body of this fish is bright red in color, is marked with tinges of yellow on the fins, and reaches a length of about two feet. It is an uncommon species and is known only from the Hawaiian Islands.

Goatfish

98-5 *Pseudupeneus pleurostigma* (Bennett)



Drawn from Jordan & Evermann

This goatfish is darker above and lighter beneath and seems to be in general a dirty white color. It may be recognized by a black spot on the side of the body just above the middle. It will reach a length of twelve inches and is commonly seen in Island markets.

This goatfish is distributed from Zanzibar and Mauretius through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Goatfish

98-6 *Pseudupeneus macronemus* (Lacepede)

This goatfish is known by a dark lateral band down the side of the body. It is found from the Red Sea and Zanzibar through the East Indies and Polynesia to the Hawaiian Islands.

Goatfish

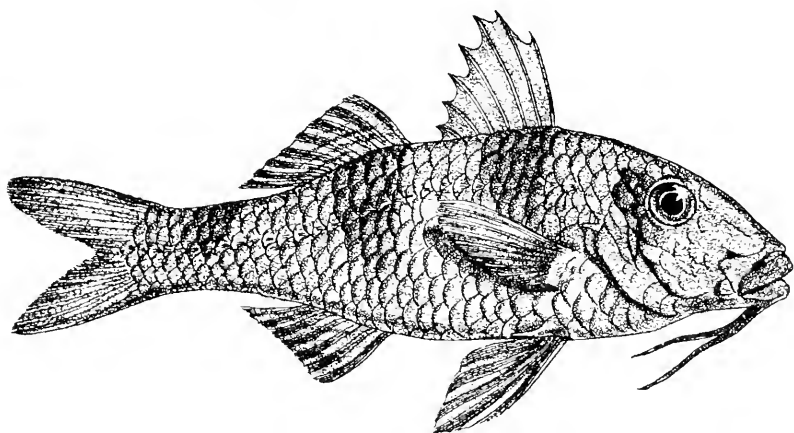
98-7 *Pseudupeneus barberinus* (Lacepede)

This goatfish reaches a length of at least twelve inches and is found from the Red Sea and Zanzibar through the Indian Ocean, the East Indies,

along Queensland, through Melanesia, Micronesia, and Polynesia to the Hawaiian Islands.

Moano

98-8 *Pseudupeneus bifasciatus* (Lacepede)



Drawn from Jordan & Evermann

The moano is dusky to reddish over its body and is marked with three or more dark bands crossing the body. It reaches a length of eleven inches and has a flesh of fine, delicate flavor.

It is distributed from New Guinea and the East Indies through Melanesia, Micronesia, and Polynesia to the Hawaiian Islands.

Goatfish

98-9 *Pseudupeneus trifasciatus* (Lacepede)

This goatfish is known by a light spot on the upper side of the body at the base of the tail. It has been recorded from the East Indies and Guam to Hawaii and Samoa.

Moana or Moano

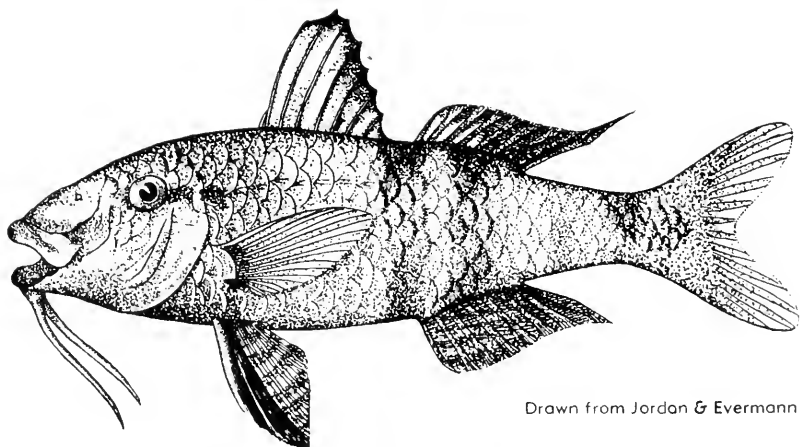
Also known as the Red and Black Banded Goatfish

98-10 *Pseudupeneus multifasciatus* (Quoy & Gaimard)

Plate IV, Figure 5

The moana is marked with alternating bands of pale rosy red and darker red in a very irregular pattern. It is conspicuous by its bright color. It will reach a length of ten inches.

It is one of the most common Hawaiian fishes and is commonly seen on the market.



Drawn from Jordan & Evermann

This species is distributed from India and the East Indies through Melanesia, Micronesia, and Polynesia as far as Easter Island, and the Hawaiian Islands.

Moana or Moano

98-11 *Pseudupeneus fraterculus* (Valenciennes)

This goatfish is marbled with green and rose over its body and is marked with two shining longitudinal lines. It will reach a length of twenty inches.

It is known from the Red Sea, Zanzibar, and the Hawaiian Islands.

Goatfish

98-12 *Pseudupeneus cyclostomus* (Lacepede)

Very little is known about this goatfish.

It is distributed through southern Polynesia and the Hawaiian Islands.

Goatfish

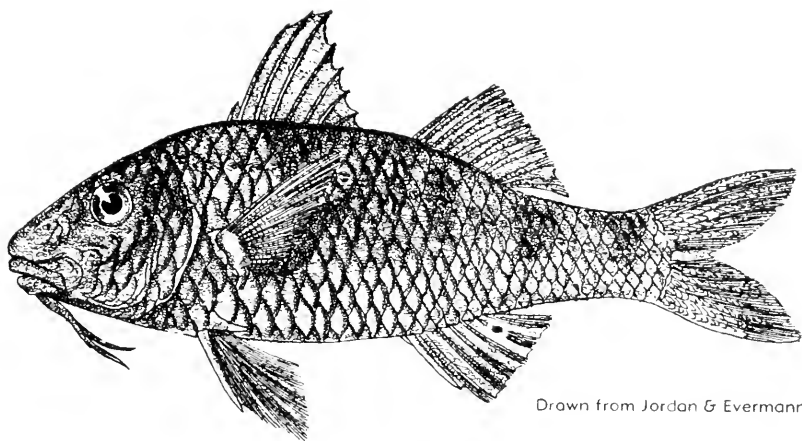
98-13 *Pseudupeneus filamentosus* (Macleay)

This goatfish is known from New Guinea, Java, Melanesia, and the Hawaiian Islands. It is an uncommon species and very little is known about it.

Kumu or Kumu Ae

98-14 *Pseudupeneus porphyreus* Jenkins

The kumu is a rich rosy color on the back and on the top of the head, paler on the sides, and whitish beneath. It reaches a length of



Drawn from Jordan & Evermann

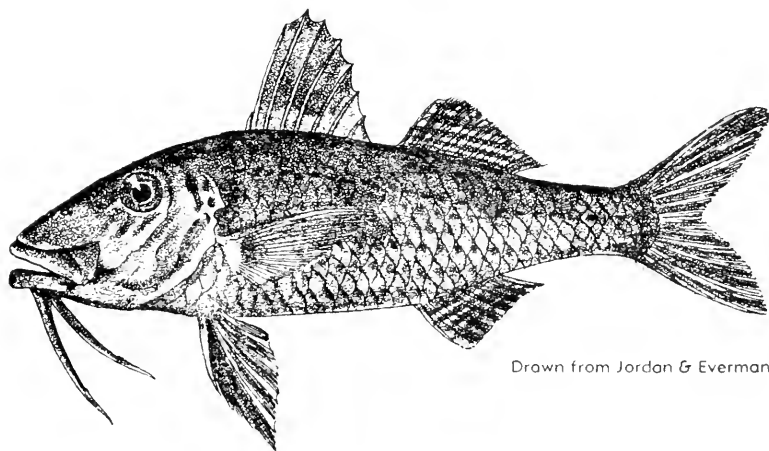
fifteen inches. It is an abundant species and is a very good food fish.

It is known from the Society Islands and the Hawaiian Archipelago.

Goatfish

98-15 *Pseudupeneus chrysonemus* Jordan & Evermann

Plate IV, Figure 7



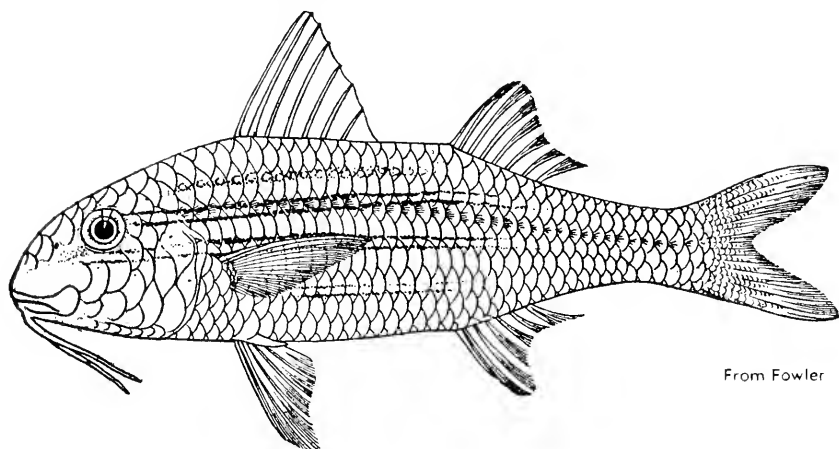
Drawn from Jordan & Evermann

This goatfish is a deep scarlet red in color above, lighter beneath, and has yellowish barbels. It measures about eight inches in length.

This fish is distributed throughout the Hawaiian Islands.

Two Lined Goatfish

98-16 *Pseudupeneus bilineatus* (Valenciennes)



From Fowler

This goatfish is readily known by its pale longitudinal lateral bands. It reaches a length of ten inches. It is known from the Red Sea, Mauretius, and Zanzibar eastward through the East Indies, Melanesia, Micronesia and Polynesia to the Hawaiian Islands.

Goatfish

98-17 *Pseudupeneus taeniatus* (Kner)

This goatfish is known from China and Polynesia as far northward as the Hawaiian Islands.

Goatfish

98-18 *Upeneus taeniopterus* Cuvier

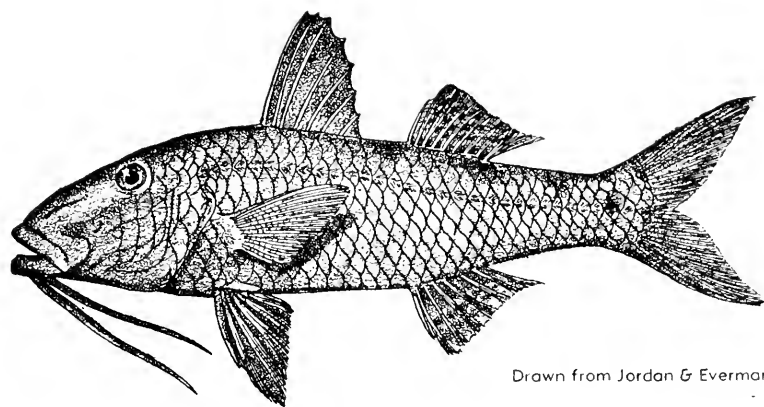
This goatfish is reddish in color over its back and is marked with large reddish spots on the body at the base of the tail. The dorsal and caudal fins are marked with brown bands.

It is known from Ceylon and the Hawaiian Islands.

Moano Kea

98-19 *Upeneus chryserydros* (Lacepede)

This fish, is described as dark leaden purple to brown in color and marked with orange spots at the end of the trunk. It is an abundant market fish. It is widely distributed throughout Oceania.

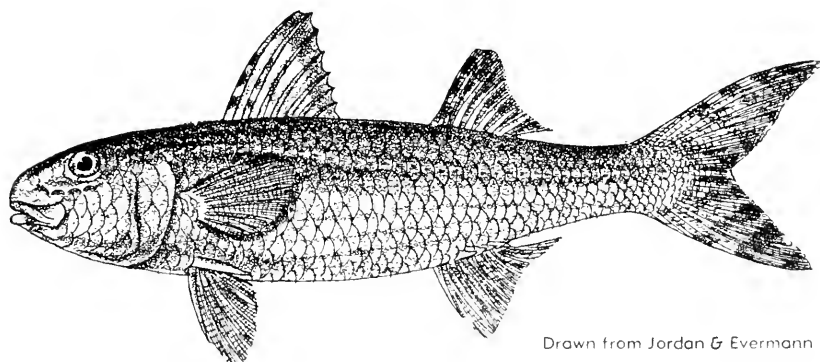


Drawn from Jordan & Evermann

Weke

Also known as the Weke Pueo, Weke Pahula, or Weke Pahulu

98-20 *Upeneus arge* Jordan & Evermann



Drawn from Jordan & Evermann

This fish is pale green in color above and changes to white beneath. It is striped with yellow above and the caudal fin is cross-barred. It reaches a length of sixteen inches.

It is distributed throughout the Hawaiian Islands and is a common food fish there, although reported by some as poisonous.

Jordan, Evermann and Tanaka in their Notes on Rare Fishes From Hawaii in California Academy of Science Proceedings 4th Series 16:20, November 14, 1927, p. 674 report an interesting story.

"Hon. John M. Wilson, Mayor of Honolulu, reports that eating the head of this fish produces a sort of delirium ('Loco'). At one time in Molokai 30 or 40 Japanese laborers working for Mr. Wilson ate the heads (with bodies) of many examples and were mentally paralyzed at the time. Mrs. Wilson once attended a function at which this fish was served. All members of the party had weird visions, some of them wandering about the house all night long. It was agreed that 'somebody must have died in that room'—a Hawaiian superstition. It is agreed that the poison lies in the brain."

THE BLANQUILLO OR WHITEY FISH FAMILY

99 Family *Malacanthidae*

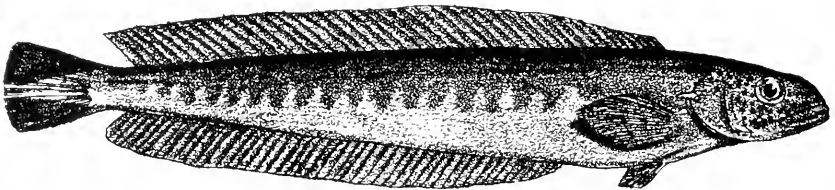
The blanquillos are fishes with slender, elongated bodies and are usually beautifully colored. They are fishes of medium to large size and inhabit the temperate and tropical seas.

Only two members of this family are known from the Hawaiian Islands.

Makaa or Ulae Mahimahi

99-1 *Malacanthus hoedtii* Bleeker

Plate 111, Figure 11



Drawn from Jordan & Evermann

The makaa is a long, slender fish, light olive green in color above and silvery beneath. The sides of the body are marked with about twenty short, faint bands of color which enter the silvery area. The tail is marked with two wide black bands placed one above and one below the middle. The fish reaches a length of one foot.

The Hawaiians named this fish Makaa or "bright eyes" because of the clear and brilliant eyes of this fish.

Plate VI



1. *Kala*
2. *Lauia*
3. *Blue Parrot Fish*
4. *Lauipala*
5. *Moorish Idol*

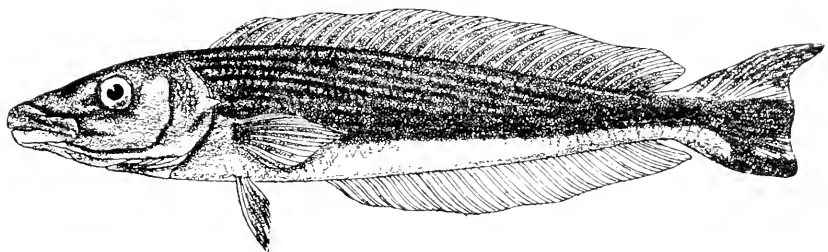
6. *Nobu*
7. *Pakuikui*
8. *Poopaa*
9. *Short Finned Scorpion Fish*

This fish is distributed from Mauretius eastward through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Ulae Mahimahi

Also known as the Blanquillo, Makaa, or Sandfish

99-2 *Malacanthus latovittatus* (Lacepede)



Drawn from Jordan & Seale

This is likewise a long, slender fish. It is of large size, will reach a length of at least sixteen inches, is brilliant sky blue on the body, and is marked by a jet black lateral line. The Hawaiians called this fish makaa or "bright eyes," while the Samoans called it by a similar name (n)gatasami or "Eye of the Sea." Ulae mahimahi means the Ulae or lizard fish that looks like the mahimahi or dolphin fish.

This blanquillo is found from Mauretius and the East Indies through Micronesia and Polynesia as far as the Hawaiian Islands.

THE HAWKFISH FAMILY

100 *Family Cirrhitidae*

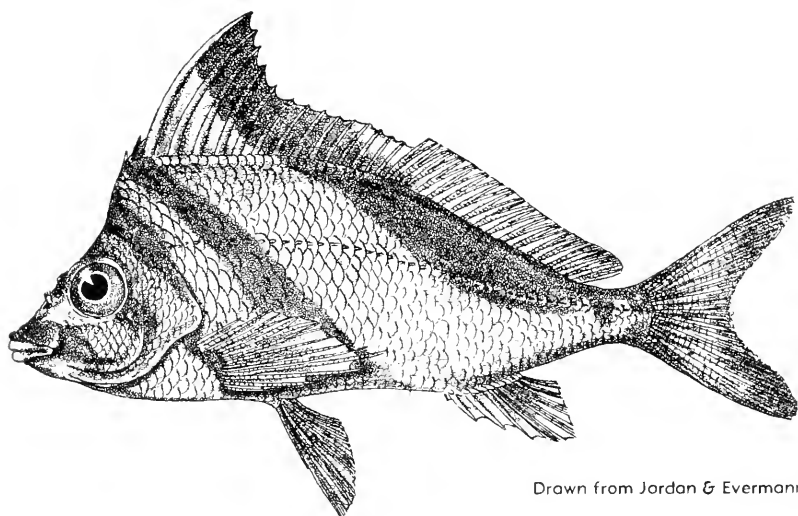
The members of this family are abundant about coral reefs and rocks. They are nearly all richly colored and are easily recognized as they sit perched among the rocks.

One genus and two species are known from American waters. At least seven members of this family are known from the Hawaiian Islands.

Hawkfish or Kikakapu

100-1 *Cheilodactylus vittatus* Garrett

The kikakapu is grayish silvery in color and is marked with five oblique brownish bands across the body. It ranges in length from six

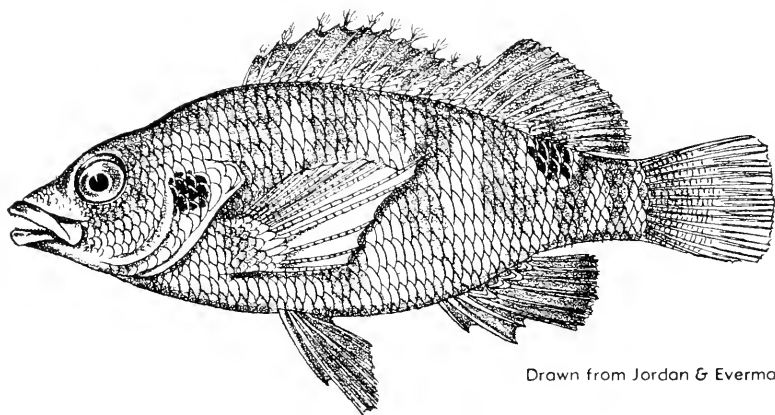


Drawn from Jordan & Evermann

to twelve inches. It is not a common fish and is known only from the Hawaiian Islands.

Two-Spot Hawkfish

100-2 *Cirrhittoidea bimaculata* Jenkins



Drawn from Jordan & Evermann

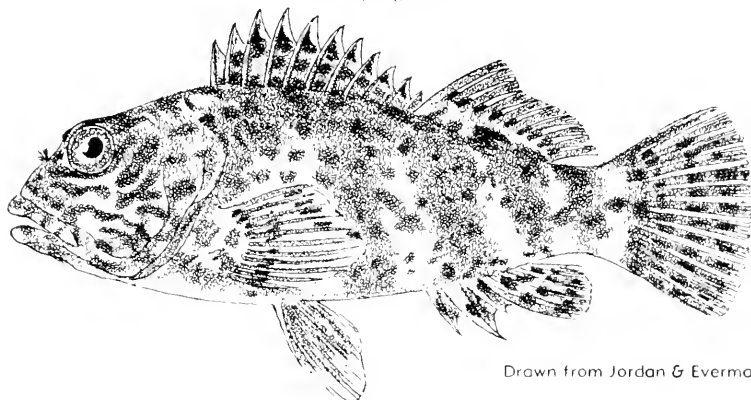
This hawkfish may be recognized by two dark spots on the side of the body. It is a small fish, measuring about two inches in length, and is known only from the Hawaiian and Leeward Islands.

Oopu Poopaa or Poopaa

Also known as the Spotted Rock Fish and Oopukai

100-3 *Cirrhitus pinnulatus* (Schneider)

Plate IV, Figure 11



Drawn from Jordan & Evermann

The body of this fish is marbled, blotched, and spotted with bluish, brownish, and whitish areas. One of the larger species in the family, it reaches a length of about ten inches.

It is known from the Red Sea and East Africa eastward through the East Indies, Micronesia, and Polynesia to Hawaii and its leeward islands. It is fairly abundant in Hawaiian waters.

Hawkfish

100-4 *Paracirrhites hemistictus* (Gunther)

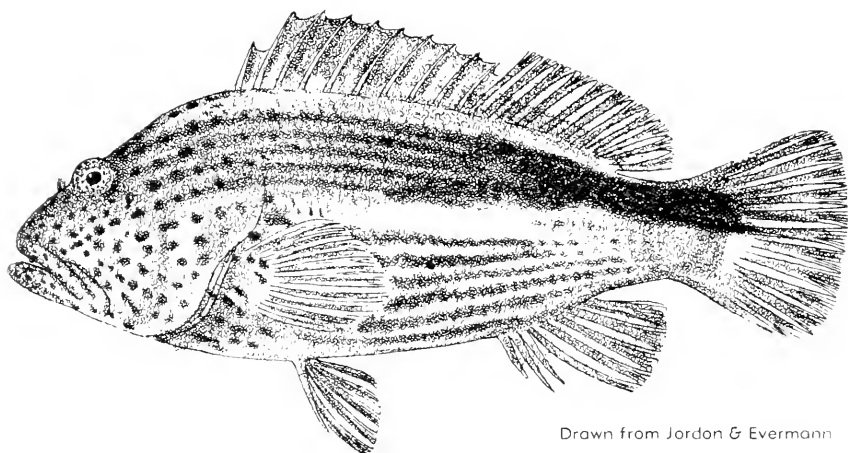
This hawkfish is brownish in color above and paler beneath. It is marked with a white band along the side of the body. It will reach a length of seven or eight inches. It is known from the Society Islands and the Hawaiian Islands. It is a rare and uncommon member of Hawaii's fish fauna.

Pilikoa or Hilu-Pilikoa

100-5 *Paracirrhites forsteri* (Schneider)

Plate IV, Figure 10

The body of the pilikoa is yellowish brown in color above and measures from four to eight inches in length. The head is covered with many dark reddish spots, the belly is yellowish in color and is marked with many indistinct longitudinal lines, while the side of the body is marked with a white stripe down the side. It is common about the coral reefs and is abundant in the markets.



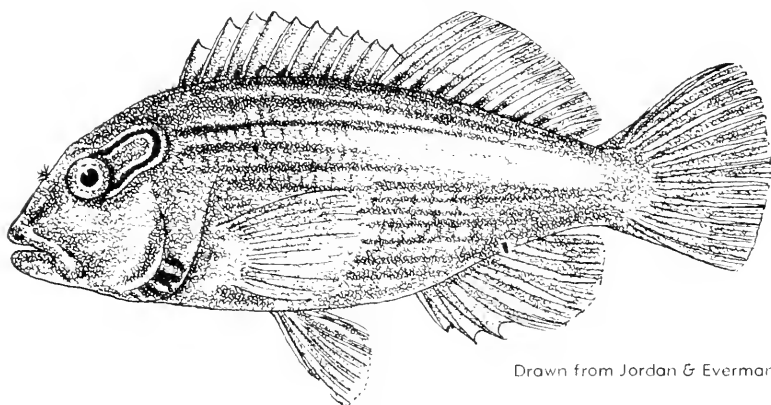
Drawn from Jordan & Evermann

The pilikoa is distributed from the Red Sea, Zanzibar, and Mauretius eastward through the East Indies and Polynesia as far as the Hawaiian Islands.

Pilikoa

100-6 *Paracirrhites arcatus* (Cuvier)

Plate IV, Figure 8

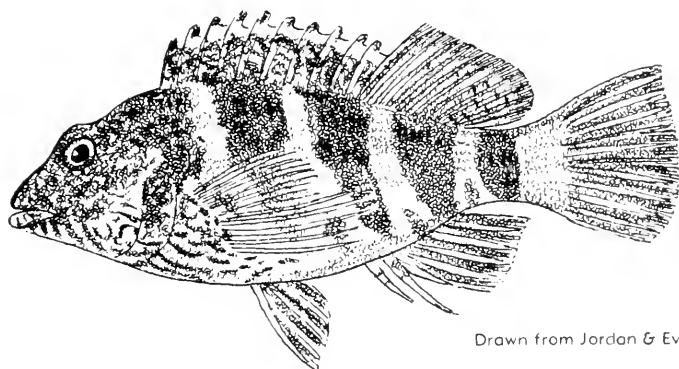


Drawn from Jordan & Evermann

This little fish measures from three to six inches in length. It is brownish in color over the entire body and is marked with narrow lines of red over the body. A broad white band ornaments the posterior half of the side of the body. This fish is fairly common in the Hawaiian Islands.

It is distributed from the Red Sea eastward through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Pilikoa or Poopaa

100-7 *Paracirrhites cinctus* (Gunther)

Drawn from Jordan & Evermann

This little hawkfish is brownish in color, is spotted with bluish, greenish, and whitish, and is marked with four large cross bars over the back half of the body. It ranges in length from two to five inches. A beautiful species, it is abundant in our waters and common in Island markets.

This hawkfish is distributed from Mauretius and Madagascar eastward through the Indian Ocean to the Society Islands and the Hawaiian Islands.

THE CAPROID FISH FAMILY

101 Family Caproidae (*Antoniidae*)

This family is a small group of fishes which inhabit rather deep water. They are usually reddish in color and are seldom captured.

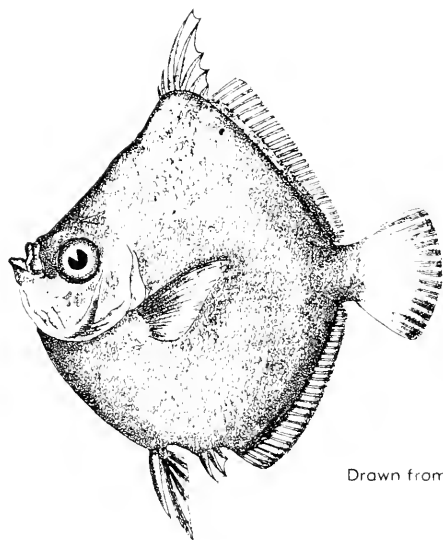
Two members of this family are known from Hawaiian waters.

Caproid Fish

101-1 *Antonia capros* Lowe

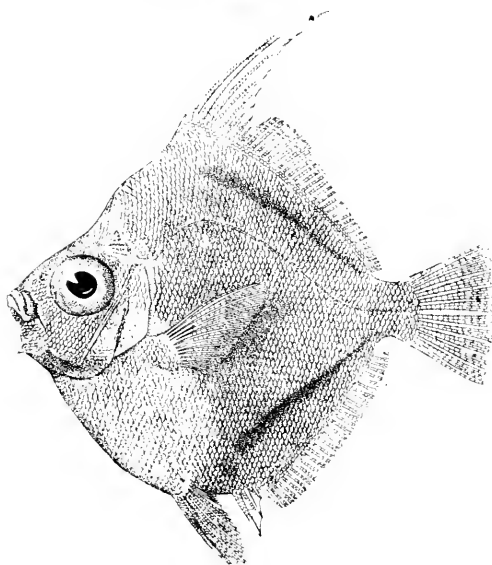
Plate V, Figure 3

The body of this fish is flat and compressed and is of a bright salmon-pink color. It ranges in length from seven to nine inches and is usually taken from deep water on hook and line. It is known to occur in Japanese and Hawaiian waters.



Drawn from Jordan & Evermann

Caproid Fish
101-2 *Antigonia eos* Gilbert



From Gilbert

The body of this fish is compressed laterally and is a light reddish color. It reaches a length of at least one inch. It is known from nine

specimens taken between 122 and 132 fathoms in the Hawaiian Islands. It has never been recorded from any other area to our knowledge.

THE BUTTERFLY FISH, CORAL FISH, AND ANGEL FISH FAMILY

102 *Family Chaetodontidae*

The butterfly fishes are one of the most interesting groups of fishes in the ocean. Noted for their queer forms, brilliant colors, and active graceful movements, they add color and life to the coral rocks among which they live. The members of the family are all greatly compressed in shape and go through growth stages in which the young develop a collar about the neck.

They are carnivorous fishes and feed on small crustacea, worms, and other creatures which they pick up with their small mouth and brush-like teeth. These fishes have but few enemies among the rocks where they live. In addition to being quick in movement, they are very hard for their enemies to swallow.

The family of the butterfly fishes is fairly common in the waters of the East Indies and are found throughout Polynesia. There are no members of the family in European waters.

Of more than 200 known species in this family, at least twenty-eight species are known from Hawaiian waters.

Butterfly Fish

102-1 *Chaetodon ephippium* Cuvier

This species reaches a length of six or seven inches. It is found from the East Indies, through Melanesia, Micronesia, Polynesia, along Queensland, and as far north as the Hawaiian Islands.

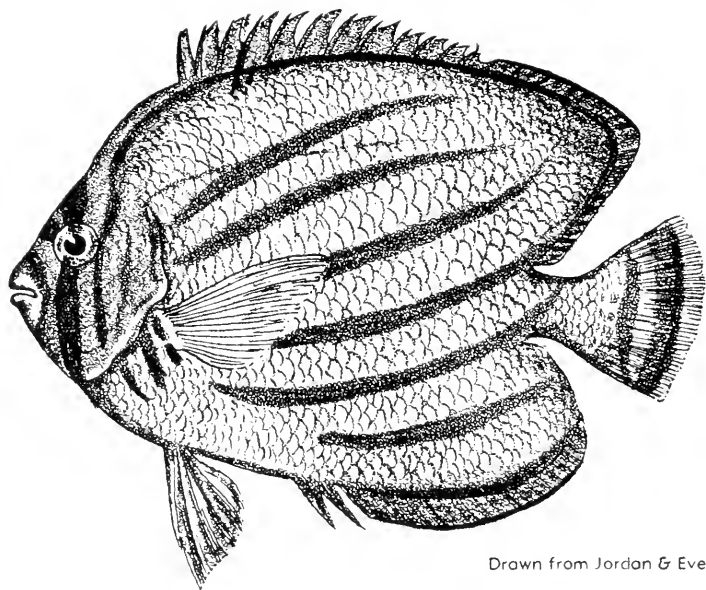
Kikikapu, Kapuhili, or Lauhau

102-2 *Chaetodon ornatissimus* Cuvier

Plate V, Figure 12

This butterfly fish is one of the most showy species in Hawaiian waters. The body is white and is marked with six or seven oblique orange-brown stripes. The head is yellow in color and is marked with two or three black vertical stripes. It varies in length from four to seven inches.

This fish is distributed from the East Indies through Melanesia and Micronesia to the Hawaiian Islands.



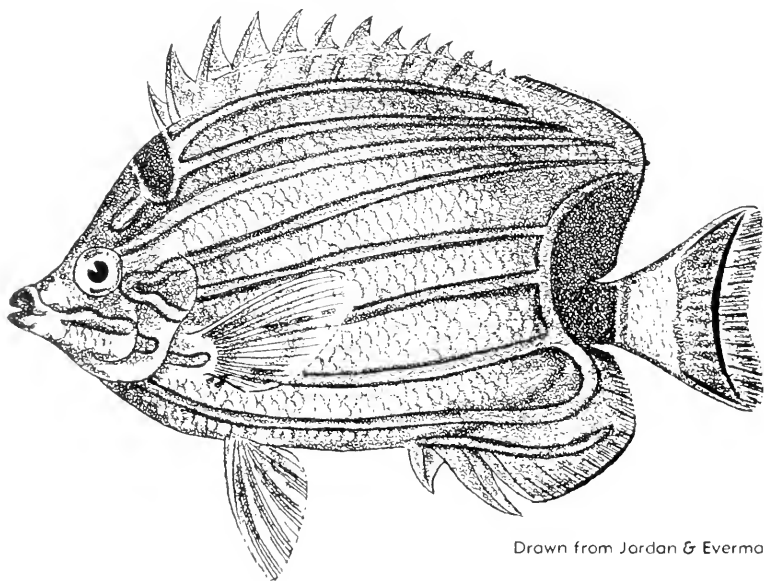
Drawn from Jordan & Evermann

Kikakapu or Kapuhili

Also known as the Blue-Lined Butterfly Fish or Lauhau

102-3 *Chaetodon fremblii* Bennett

Plate V, Figure 9



Drawn from Jordan & Evermann

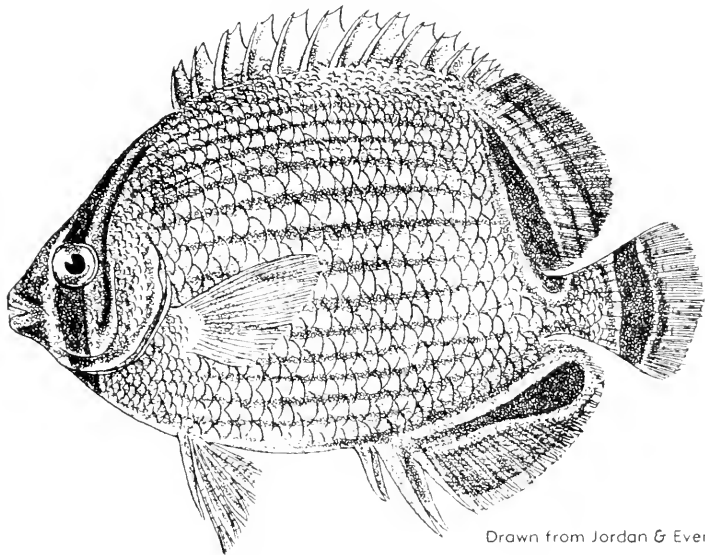
The body of this butterfly fish is pale yellow in color and is marked with eight longitudinal blue lines along the body. In addition, the body is marked with two black spots located one above the eye at the beginning of the dorsal fin and the other at the base of the tail. This fish is a common species and reaches a length of three to six inches.

This butterfly fish is known only from the Hawaiian Archipelago.

Kapuhili

102-4 *Chaetodon trifasciatus* Mungo Park

Plate V, Figure 2



Drawn from Jordan & Evermann

The color of this fish varies somewhat. The head and the jaws are blackish and are marked with a vertical stripe through the eye. The body is a dirty yellowish color and is marked with many darker streaks running lengthwise through the body. A black stripe with a yellow border marks the back end of the dorsal fin, the caudal fin, and the anal fin. This fish reaches a length of about six inches.

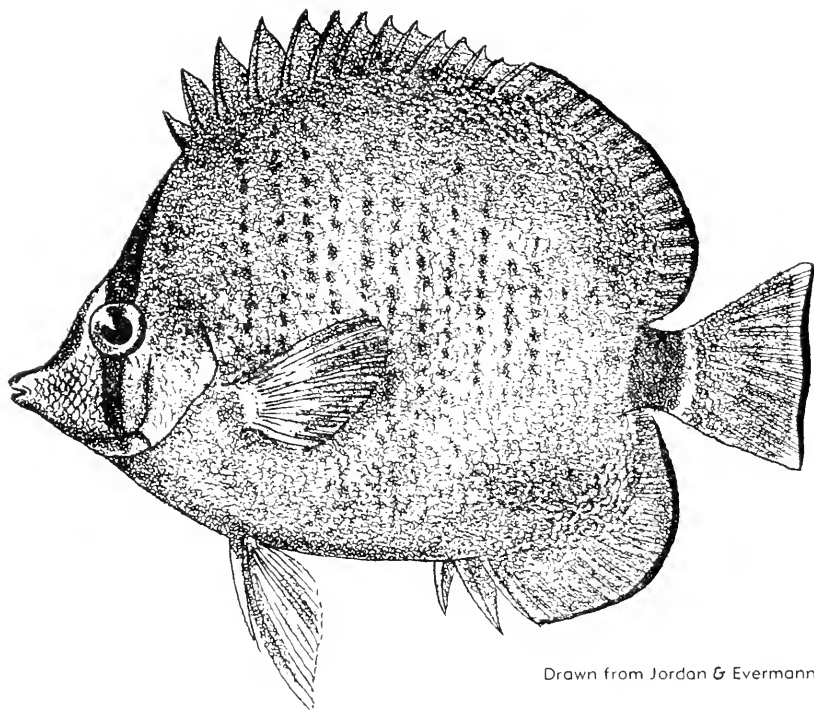
Although it is widely distributed in Polynesia, it is quite rare about Hawaiian coral reefs.

This fish is distributed from the Red Sea, Mauretius and Zanzibar through the Indian Ocean, the East Indies, Melanesia, Micronesia, Polynesia, along Queensland and as far north as the Hawaiian Islands.

Lauwiliwili or Manini

102-5 *Chaetodon miliaris* Quoy & Gaimard

Plate V, Figure 4



Drawn from Jordan & Evermann

The body of this fish is pale yellow in color and is marked with about twelve vertical rows of blue spots. The base of the tail is black and there is a black stripe through the eye. It reaches a length of one to six inches and is common about Hawaiian coral reefs.

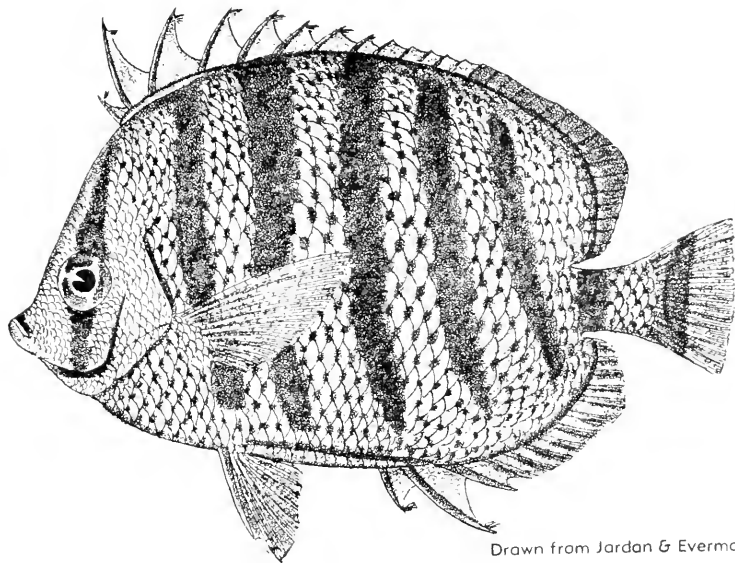
This fish is distributed from Zanzibar eastward through Ceylon, the East Indies, Melanesia, and Polynesia as far north as the Hawaiian Islands.

Butterfly Fish

102-6 *Chaetodon citrinellus* Cuvier

This fish is found from the East Indies, along Queensland, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Butterfly Fish

102-7 *Chaetodon punctato-fasciatus* Cuvier

Drawn from Jordan & Evermann

This butterfly fish is marked with six dark vertical bands on the body and one on the tail. Probably of a yellowish color in life, it is a pale brown color in alcohol. It reaches a length of four inches.

A rare fish, it is distributed through the East Indies, Melanesia, Micronesia and as far north as the Hawaiian Islands.

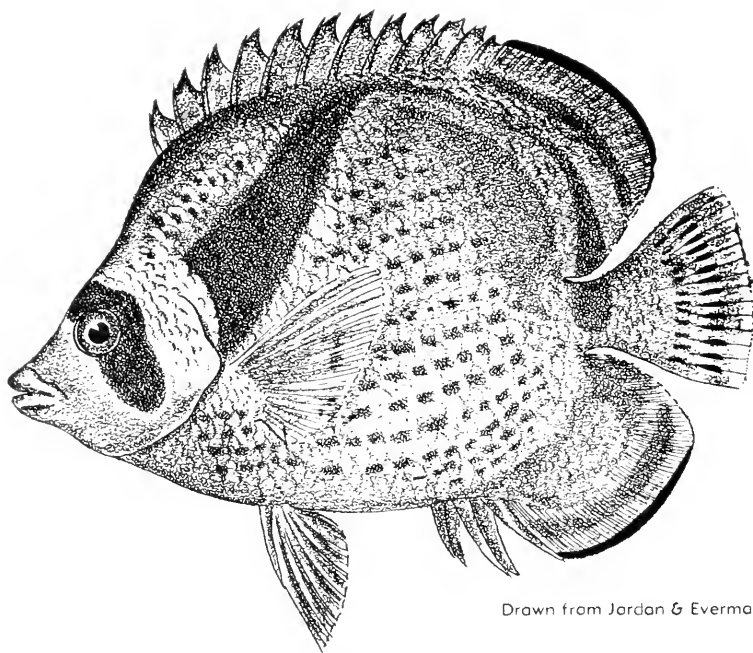
Kikakapu, Kapuhili, or Lauhau

102-8 *Chaetodon lunula* (Lacepede)

Plate V, Figure 8

The kapuhili is a yellowish olive color in life and is marked with a broad black band running vertically through the eye and a black stripe at the base of the tail. It reaches a length of seven inches and is occasionally seen in island markets.

This fish is distributed from the Red Sea, Zanzibar, Mauritius, through the Andaman Islands, the East Indies, along Queensland and China, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands. It is a common species in Samoa.

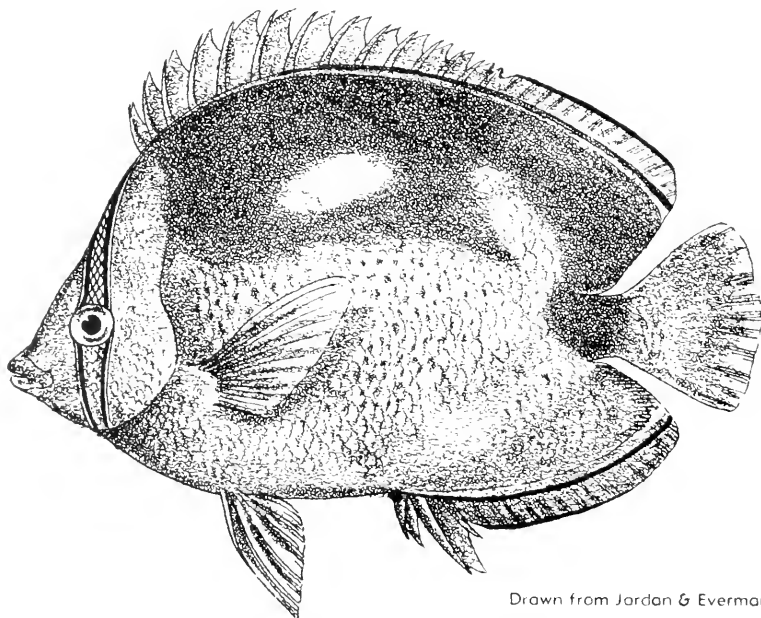


Drawn from Jordan & Evermann

Lauhau or Four-Spotted Butterfly Fish

102-9 *Chaetodon quadrimaculatus* Gray

Plate V, Figure 7



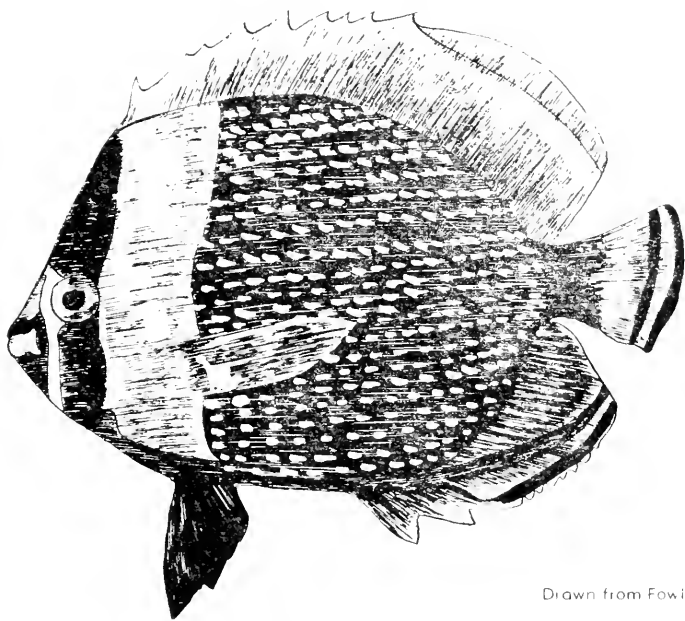
Drawn from Jordan & Evermann

The body of this fish is sooty gray above and grayish beneath. It is marked with spots on either side of the back and with a vertical golden black-edged bar which runs through the eye. It ranges from three to six inches in length, is fairly common about Hawaiian reefs, and is occasionally seen in Island markets.

This fish is distributed throughout Polynesia and the Hawaiian Islands.

Reticulated Butterfly Fish

102-10 *Chaetodon reticulatus* Cuvier



Drawn from Fowler

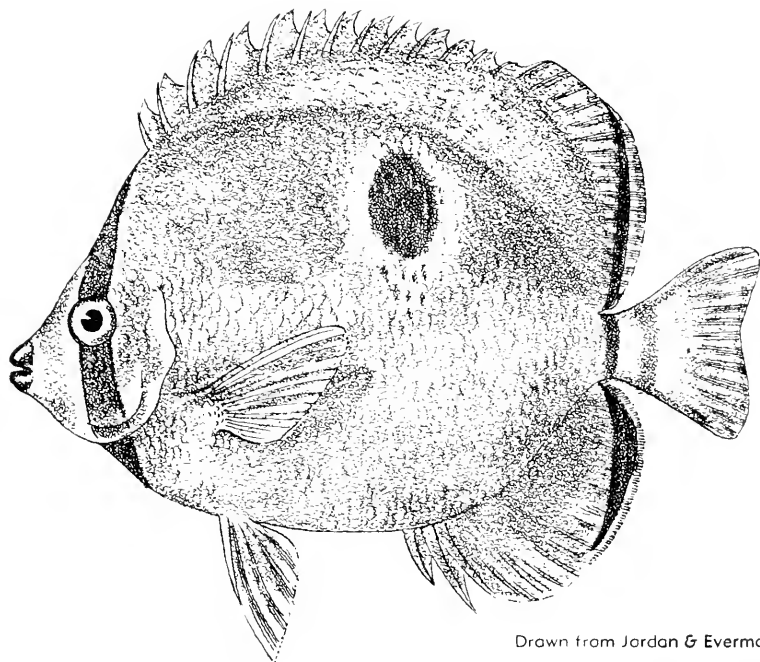
This fish reaches a length of six inches. It is distributed from India, along the coast of China, through the East Indies, Micronesia, Japan, and the Hawaiian Islands.

Kikakapu or Lauhau

102-11 *Chaetodon unimaculatus* Bloch

Plate V, Figure 6

The body of this fish is light golden in color above and grayish beneath. A vertical blackish stripe passes through the eye and a round,



Drawn from Jordan & Evermann

black spot marks the side of the body just above the middle. This fish is fairly common about our reefs.

The kikakapu is distributed from Zanzibar and Madagascar through Ceylon, the East Indies, Melanesia, and Polynesia as far as the Hawaiian Islands.

Butterfly Fish

102-12 *Chaetodon auriga* Forskal

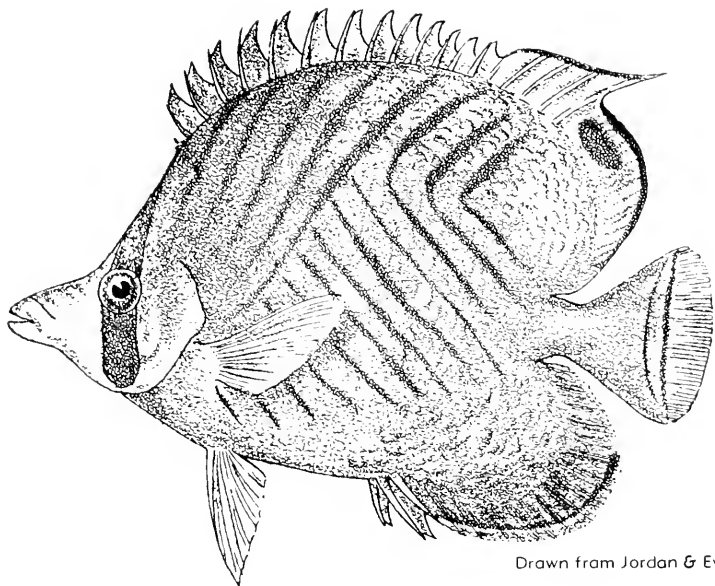
This fish reaches a length of eight inches. It is found from the Red Sea eastward through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Kikakapu or Lauhau

102-13 *Chaetodon setifer* Bloch

Plate V, Figure 5

The body of this butterfly fish is a light violet color in front and below and is marked with a vertical black stripe through the eye. The upper rear part of the body is yellowish in color and is marked with a



Drawn from Jordan & Evermann

single black spot. The sides of the body are marked with three sets of thin diagonal lines. It reaches a length of eight inches and is common in Island markets.

This fish is distributed from the Red Sea, Zanzibar, and Mauretius through the East Indies, along China and Queensland, and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

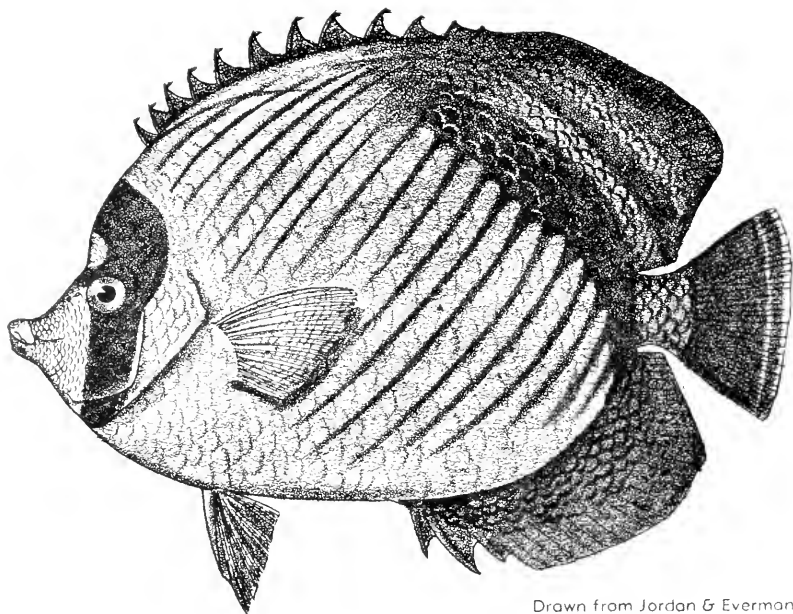
Kapuhili, Kikakapu, or Lauhau

102-14 *Chaetodon lineolatus* Cuvier

This butterfly fish is whitish in color on the front part of the body, while the rear part of the body is blackish in color and is marked with many blackish lines running obliquely forward. A vertical black stripe passes through the eye.

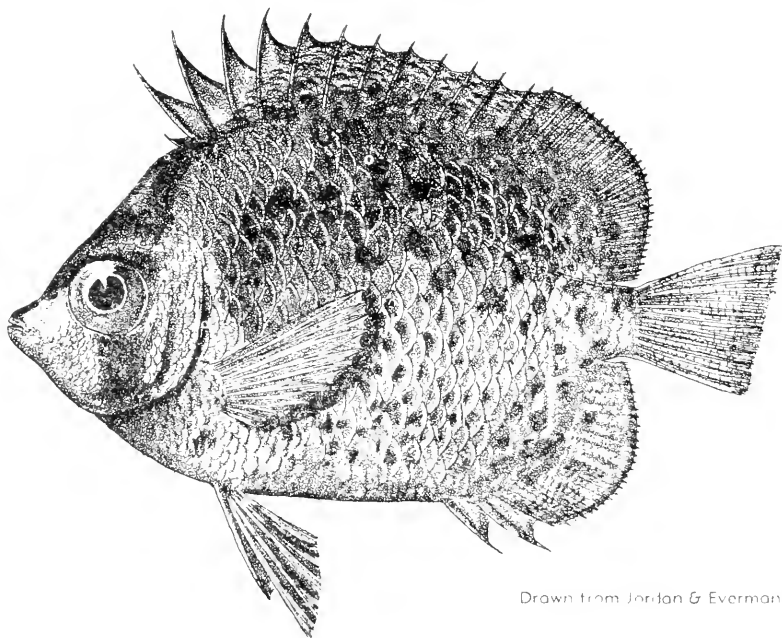
This fish is found from the Red Sea, Zanzibar, and Mauretius through the East Indies, along Queensland, through Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands.

A common species in Samoan waters, it is scarce in the Hawaiian Islands.



Drawn from Jordan & Evermann

Hawaiian Butterfly Fish
102-15 *Chaetodon corallicola* Snyder

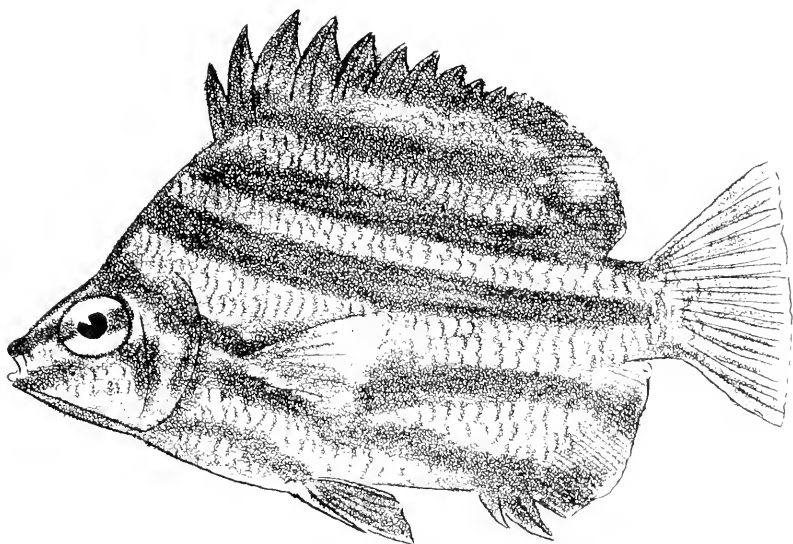


Drawn from Jordan & Evermann

This fish is known only from the Hawaiian Islands. It measures about four inches in length and was taken between 27 and 29 fathoms.

Convict Fish or Stripey

102-16 *Microcanthus strigatus* (Cuvier)



Drawn from Jordan & Evermann

The body of this fish is creamy whitish in color and is marked with five or six horizontal brown bars. It reaches a length of six inches.

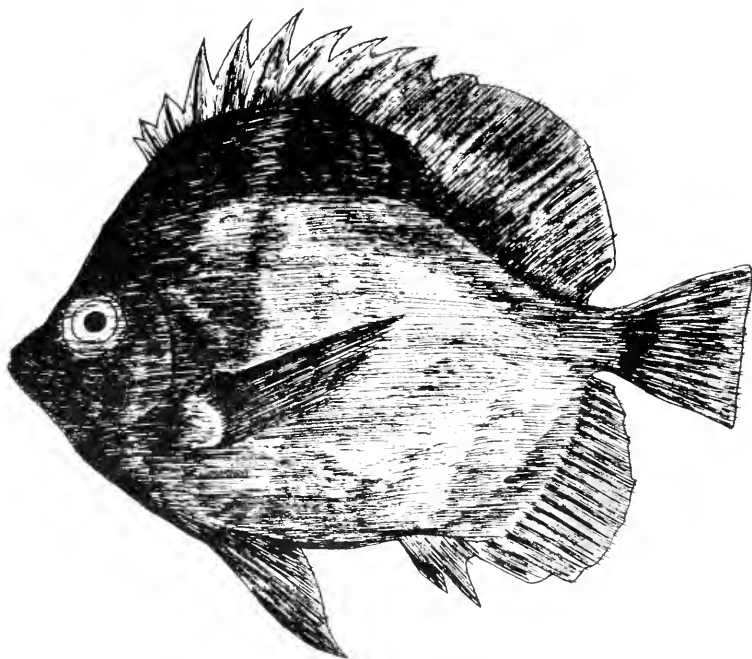
Several specimens of this fish have been in the Waikiki Aquarium for seventeen years.

This fish is distributed from Australia, through the Philippine Islands, China, Japan and the Hawaiian Islands. This fish is far more common in the extreme western Pacific than in the Hawaiian Islands.

Butterfly Fish

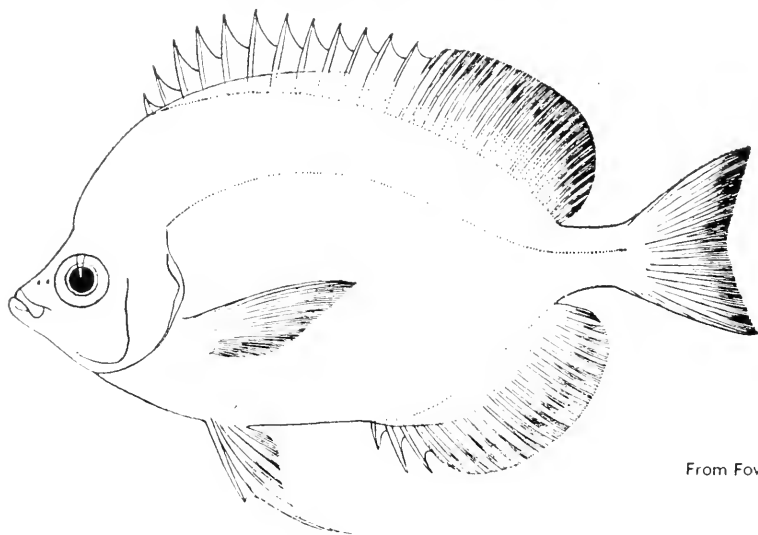
102-17 *Hemitaenichthys zoster* (Bennett)

This fish measures about six inches in length and is found in the East Indies and the Hawaiian Islands.



Drawn from Fowler

Thompson's Butterfly Fish
102-18 *Hemitaenidia thompsoni* Fowler

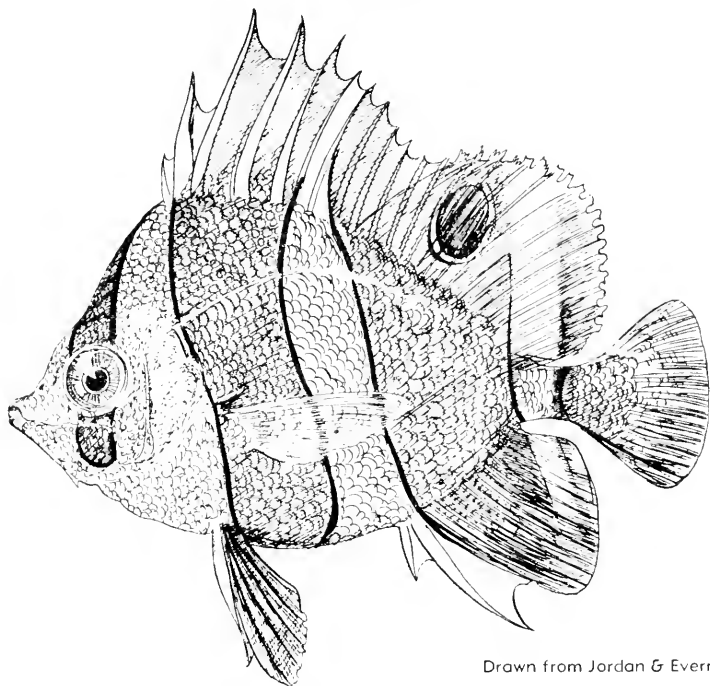


From Fowler

This fish is uniformly dark in color. It is known only from the Hawaiian Islands.

Butterfly Fish

102-19 *Heniochus monoceros* Cuvier



Drawn from Jordan & Evermann

This fish is distributed from Mauretius through the East Indies and Polynesia as far as the Hawaiian Islands.

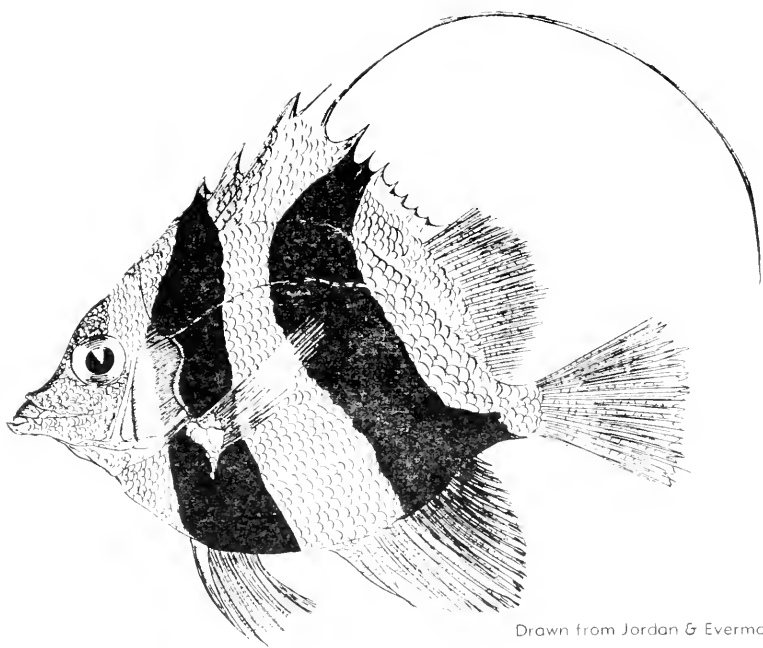
Long Finned Butterfly Fish

102-20 *Heniochus acuminatus* (Linne)

Plate V, Figure 11

This butterfly fish is whitish in color and is marked with two wide and one narrow vertical grayish bands. The pectoral, soft dorsal, and the caudal fins are yellow. It will reach a length of about eight inches.

This fish is widely distributed. It is found from the Red Sea, Zanzibar, Mozambique, Natal, Reunion, Mauretius, and the Seychelles through Ceylon, India and the East Indies, along Queensland and China, and through Melanesia, Micronesia, and Polynesia as far as Japan and the Hawaiian Islands.



Drawn from Jordan & Evermann

Butterfly Fish

102-21 *Heniochus permutatus* Cuvier

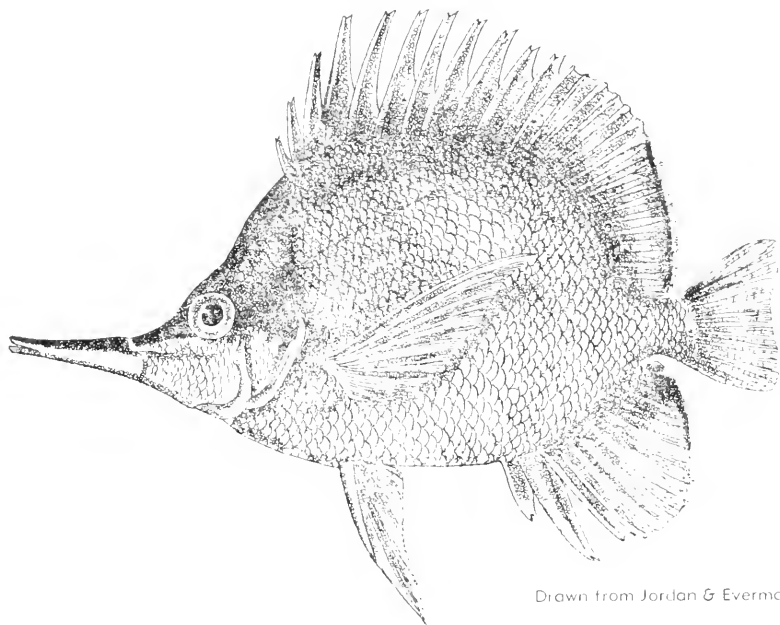


This fish measures about seven inches in length. It is found throughout the East Indies, along Queensland, throughout Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Lauwiliwili Nukunuku Oeoc or Kikakapu

102-22 *Forcipiger longirostris* (Broussonet)

PLATE V, FIGURE 1



Drawn from Jordan & Evermann

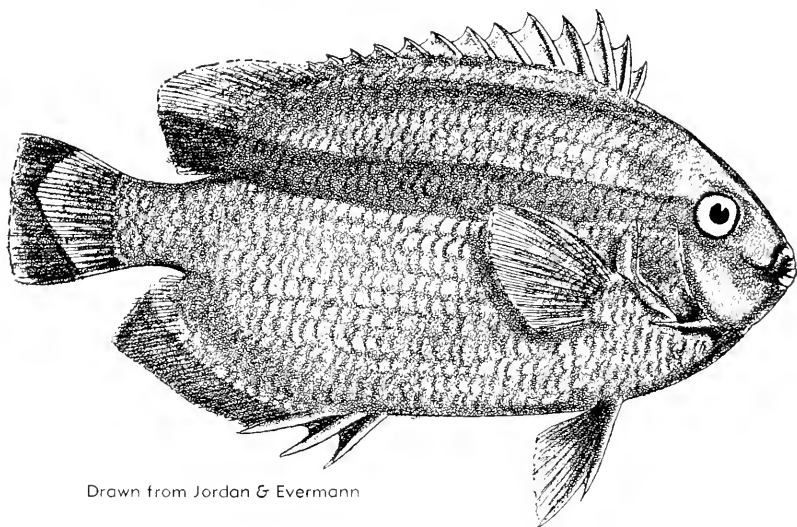
This unusual butterfly fish is orange in color above and white beneath. It is marked with a triangular black spot over the head and a black spot on the anal fin. It reaches a length of about seven inches.

It is interesting to note that this fish was the first Hawaiian Island fish ever described by scientists. The first record of it was made by Broussonet in 1782. There is a record of one specimen of this fish which has been in alcohol for over a century and it is still well preserved.

The Hawaiian name of this fish is interesting. Lauwiliwili means unpredictable. Nukunuku means snout and oe or oe-oe means long. So the name comes to mean the unpredictable fish with the long snout.

This fish is distributed from Eastern Africa and Mauretius through India and the East Indies, along Queensland, and through the islands of Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Angel Fish

102-23 *Holacanthus arcuatus* Gray

Drawn from Jordan & Evermann

The body of this fish is pale or whitish in color and is marked with a broad horizontal blackish stripe from the eye across the body to the end of the dorsal fin. The anal and caudal fins are bordered with black. It reaches a length of about seven inches. It is a rare species in Hawaiian waters.

Angel Fish

Also known as the Vaqueta de Dos Colores and Rock Beauty

102-24 *Centropyge bicolor* (Block)

This fish is jet black in color over half of the body and golden over the other half. It reaches a length of about four inches.

It is distributed through the East Indies, Melanesia, Micronesia, and Polynesia and is thought to occur in the Hawaiian Islands.

Angel Fish

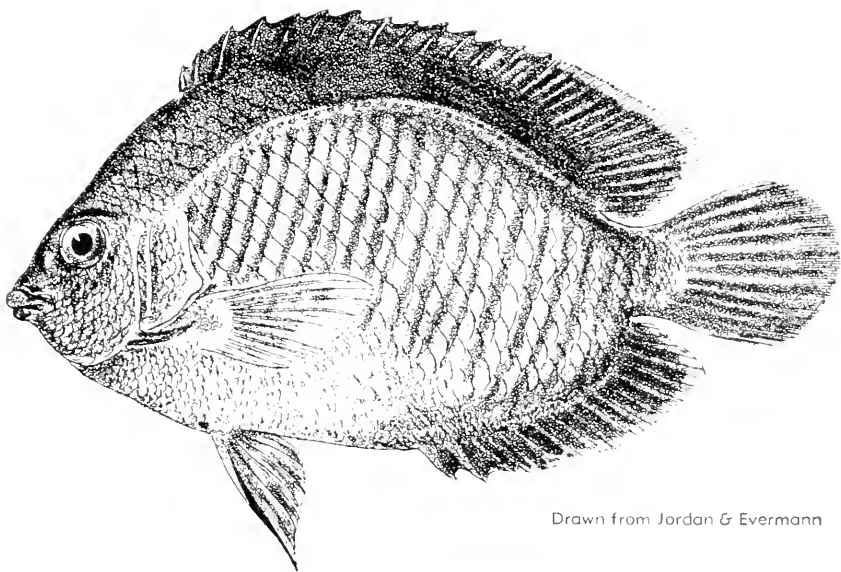
102-25 *Centropyge flavissimus* (Cuvier)

This angel fish is golden in color and is marked with deep blue markings. It is found through Melanesia and southern Polynesia and is thought to occur in the Hawaiian Islands.

Angel Fish

102-26 *Centropyge bispinosus* (Gunther)

Plate V, Figure 10



Drawn from Jordan & Evermann

The body of this fish is dark in color and is marked by diamond-shaped spots which form many oblique vertical lines across the body. This fish reaches a length of about eight inches.

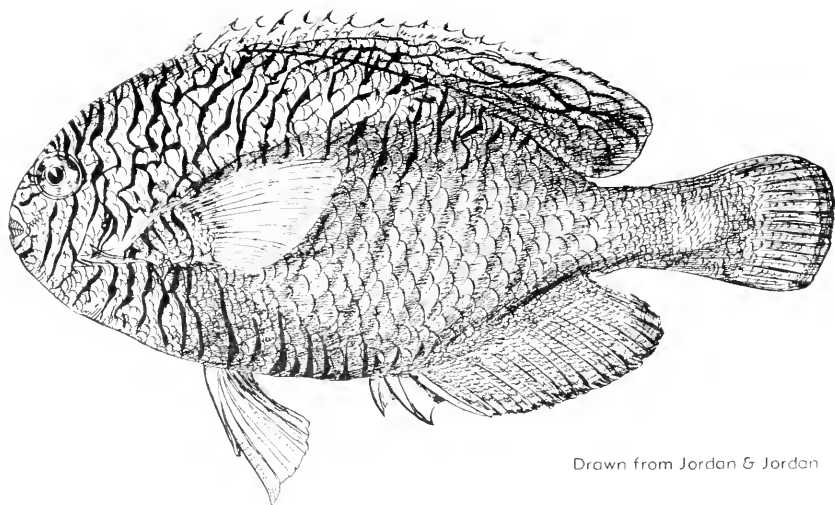
Distributed through Melanesia and Polynesia, it is not a very common species in the Hawaiian Islands.

Potter's Angel Fish

102-27 *Centropyge potteri* (Jordan & Metz)

This fish was named for Frederick Potter, for many years Director of the Aquarium at Waikiki in Honolulu. It is a small species measuring about four inches in length and is scarlet in color over the front and upper parts of the body. The posterior and lower portions of the body are of a purplish black color. The scarlet areas of the body are marked by many darker lines which form a reticulated pattern over the head and back of the body.

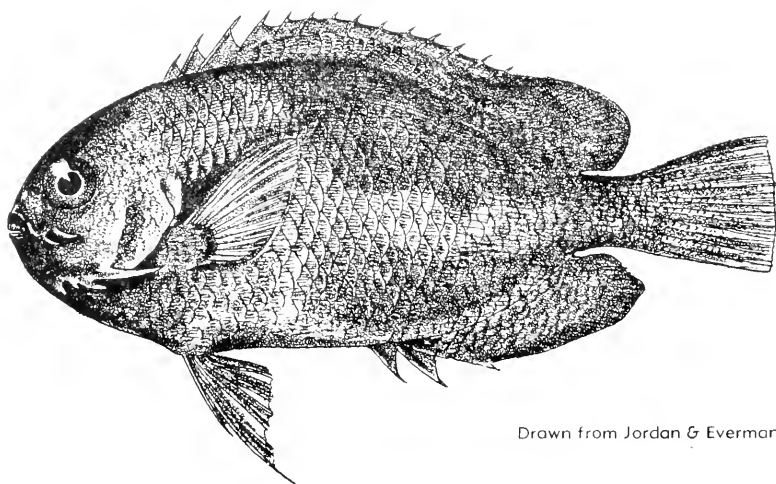
This fish is found only in the Hawaiian Islands.



Drawn from Jordan & Jordan

Kole or Fisher's Angel Fish

102-28 *Centropyge fisheri* (Snyder)



Drawn from Jordan & Evermann

The body of this fish is of a bright reddish orange color in life and is marked with dusky and bluish markings. It reaches a length of about three inches and is known only from the Hawaiian Islands.

THE MOORISH IDOL FISH FAMILY

103 Family Zanclidae

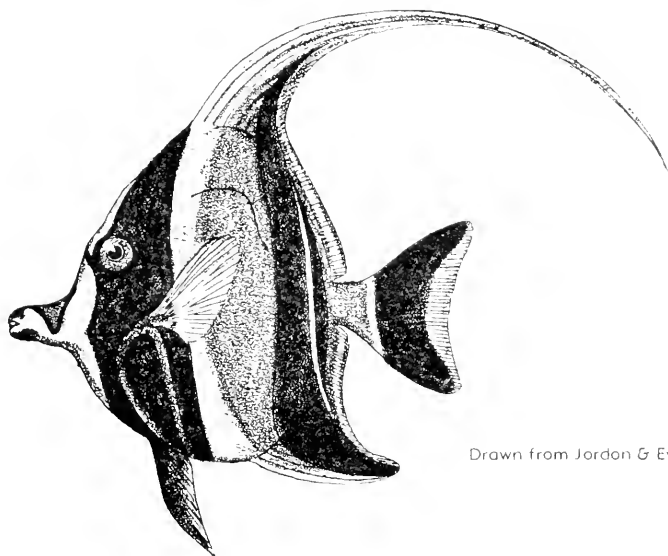
This family includes but a single individual related in many ways to the family of the butterfly fishes. The form of the body is more exaggerated than in the butterfly fishes, the scales are reduced to a fine shagreen, and two bony horns grow out over the eyes in the adults.

The single species in the family is widely distributed among the rocky islands of the Pacific Ocean.

Moorish Idol or Kihikihi Loulu

103-1 *Zanclus canescens* (Linne)

Plate VI, Figure 5



Drawn from Jordan & Evermann

The body of the moorish idol is brilliantly marked with vertical, black, yellow and white bands. The body is greatly flattened and bears a rather remarkable long high dorsal fin. It reaches a length of about seven inches.

This fish is much used by artists, sign painters, and decorators as an inspiration for their designs.

A handsome fish, it is common about our reefs and is often seen in the markets.

This fish is distributed from Zanzibar and Mauretius through the Indian Ocean, the East Indies, Melanesia, Micronesia, and Polynesia, and from the coast of Japan to the islands off the coast of Mexico.

THE TANG, SURGEON FISH, OR DOCTOR FISH FAMILY

104 *Family Hepatidae (Acanthuridae, Tenthididae)*

The family of the surgeon fishes is of interest to us because of a peculiar bony plate or spine which they bear on the sides of their tails. In these fishes the teeth are flat and incisor-like and the scales which cover the body are reduced to a fine shagreen. Although most of the members of the family are of dull or sombre colors, a few of the species are brilliantly marked.

The young of these fishes are most different from the adults and are often nearly impossible to recognize.

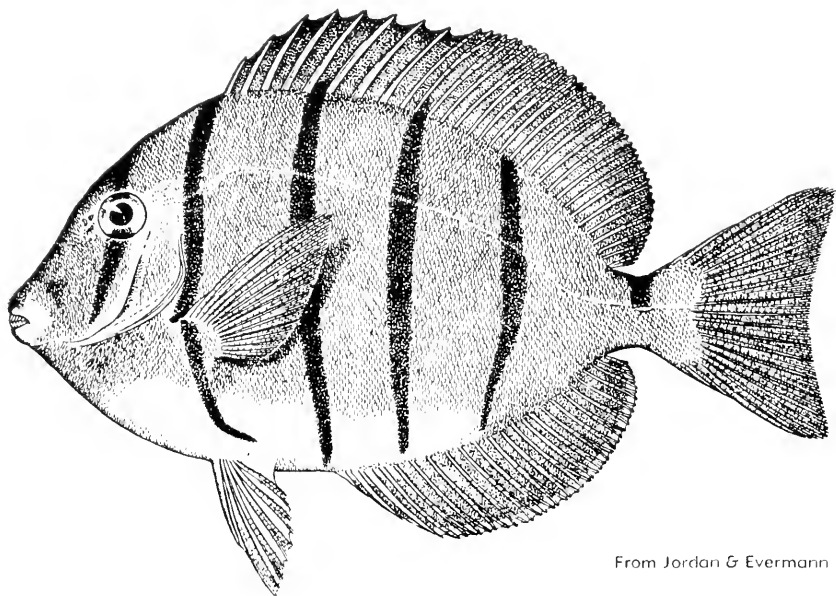
All of the members of the family are herbivorous and inhabit the pools and reefs of the warmer seas.

Of more than eighty known species, more than twenty are known from the Hawaiian Islands.

Manini or Convict Fish

Also known as the Convict Tang or Hinalea

104-1 *Hepatus triostegus* (Linne)



From Jordan & Evermann

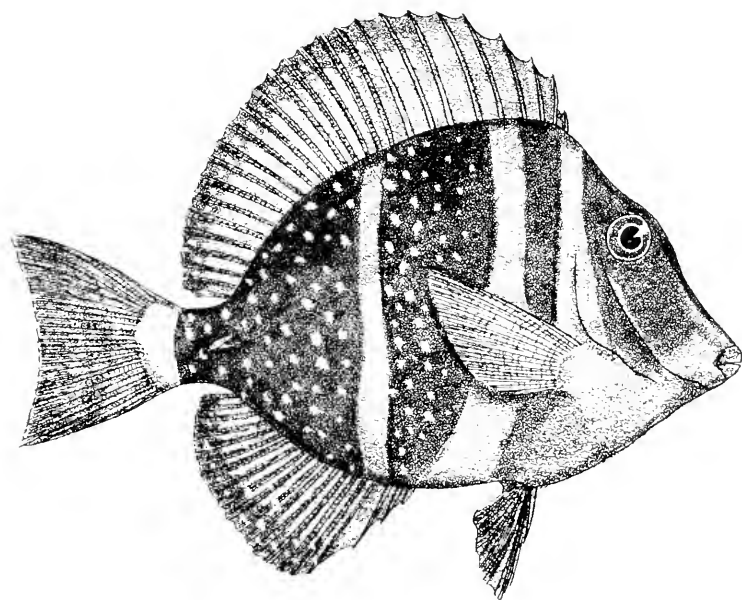
The manini is easily recognized by its marking of vertical black bands on a paler background. It varies somewhat in color and will measure as much as nine inches in length.

Commonly sold in the markets, it is one of the most abundant fishes about the reefs in Hawaiian waters.

This fish is widely distributed and abundant throughout Polynesia. It is found from Mauretius, the Bourbon and Seychelles through the East Indies, along Queensland, and out into Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Maiko

104-2 *Hepatus guttatus* (Schneider)

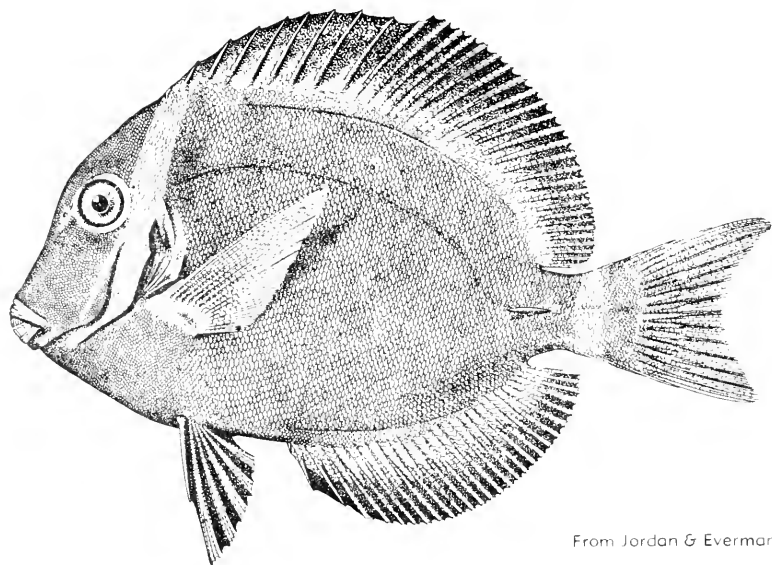


Drawn from Jordan & Evermann

This surgeon fish reaches a length of about one foot. It appears to live in the waters at the outer edge of the reefs. Common in Samoa it is rather uncommon about the Hawaiian Islands.

This fish is found from Mauretius and the Bourbons through Melanesia, Micronesia and Polynesia as far north as the Hawaiian Islands.

Maikoiko

104-3 *Hepatus leucopareius* (Jenkins)

From Jordan & Evermann

This fish is marked with a vertical white band behind the eyes and another at the base of the tail. It reaches a length of eight or nine inches.

This fish is found throughout Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Pualu

Also known as the Maiii or Palapala

104-4 *Hepatus elongatus* (Lacepede)

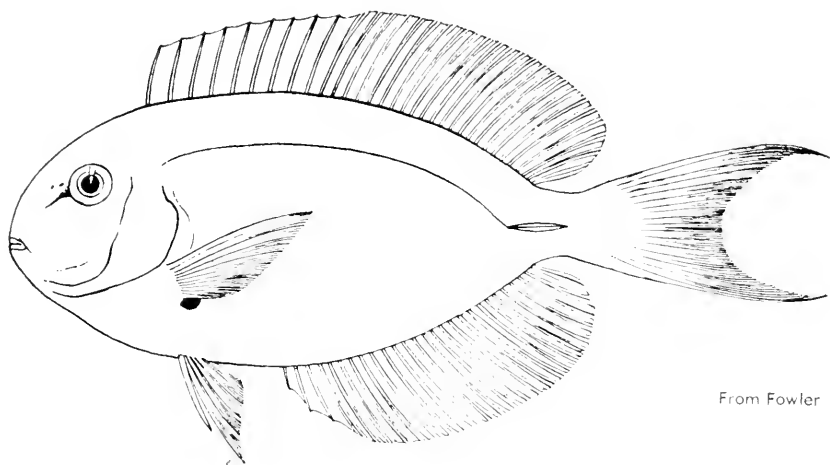
This fish is uniformly dark brown in color and is marked with a black spot at the posterior edge of the dorsal and anal fins. It reaches a length of about eight inches. It is widely distributed among the islands of Oceania.

Thompson's Surgeon Fish

104-5 *Hepatus thompsoni* Fowler

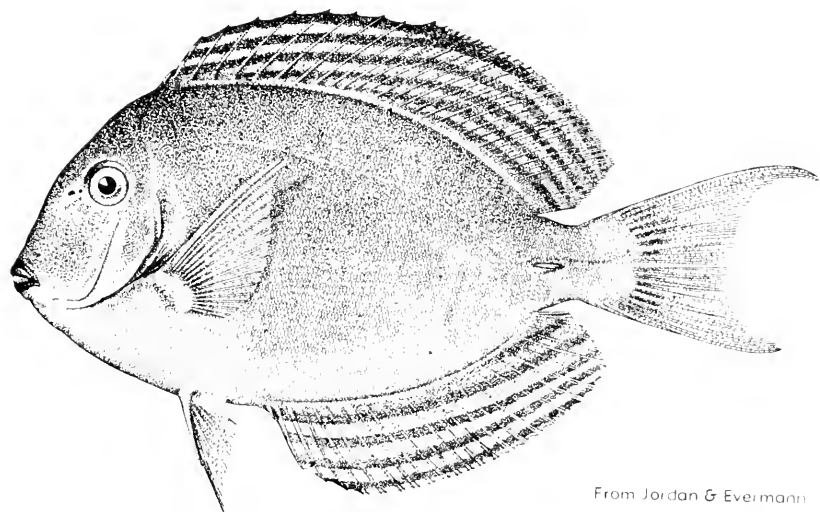
This fish is uniformly brownish in color and may be recognized by a black spot at the base of the pectoral fin.

It is known to inhabit the waters about Wake and the Hawaiian Islands.



From Fowler

Walu, Pualu, or Black Tang
104-6 *Hepatus fuliginosus* (Lesson)

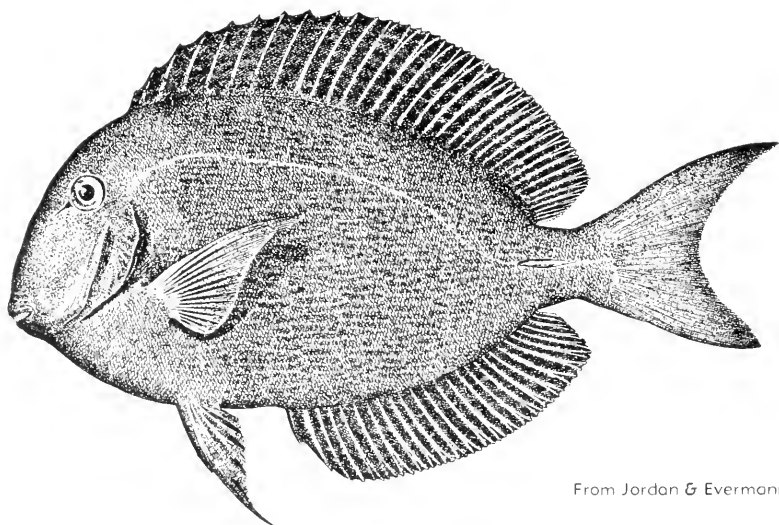


From Jordan & Evermann

The pualu is uniformly dark in color and measures from six to eighteen inches in length.

This fish is found from Madagascar, Maurerius, the Bourbons, and the Seychelles, through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Maiii, Maikoiko, or Maiko
104-7 *Hepatus lineolatus* (Valenciennes)

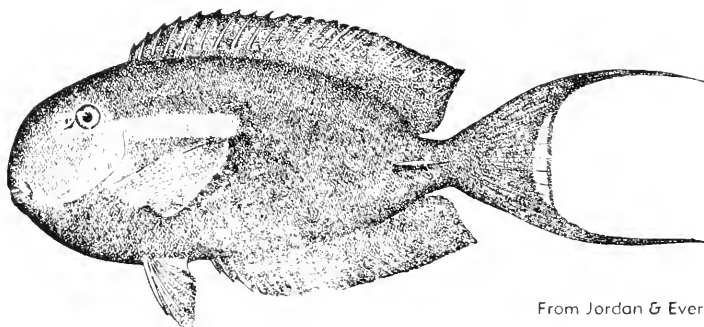


From Jordan & Evermann

This fish is an uncommon species in the Hawaiian Islands. It is of a uniform brownish color and reaches a length of about fifteen inches.

It is distributed through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Naenae or Orange Spot Tang
104-8 *Hepatus olivaceus* (Schneider)



From Jordan & Evermann

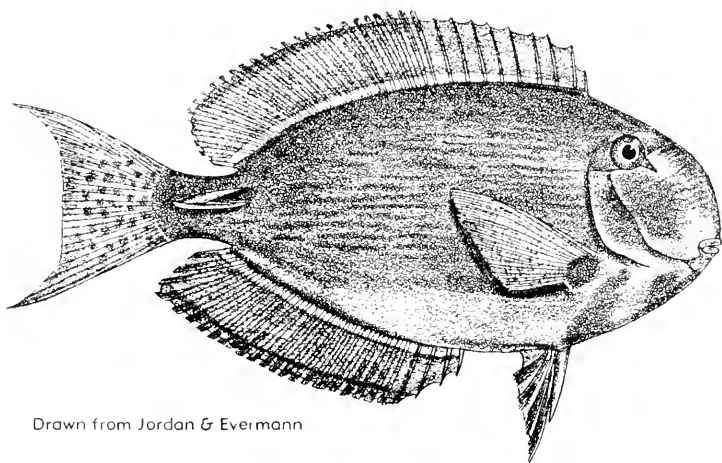
The naenae is olivaceous in color with a bluish cast on its lower side. The side of the body of this fish is marked by a vivid orange stripe placed

just behind the eye. The tail fin is blackish in color and is marked with a vertical stripe. The naenae will reach a length of twelve inches.

This surgeon fish is abundant in Hawaiian waters and is commonly seen in the markets. It is distributed throughout the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Pualu or Maikoiko

104-9 *Hepatus bariene* (Lesson)



Drawn from Jordan & Evermann

This fish is a bluish color in life with a brassy cast to its skin. The trunk is covered with many fine longitudinal lines. The dorsal fin is marked by a brassy line along its base, the anal fin by a bluish line along its base, and the tail fin is bluish in color and is covered with small, blackish dots.

This fish is found from Mauretius, through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Surgeon Fish

104-10 *Hepatus nigricans* (Linne)

This surgeon fish measures about eight inches in length. An uncommon species in the Hawaiian Islands, it is distributed from the Red Sea and Mauretius, through Indian waters, the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Surgeon Fish

104-11 *Hepatus glaucopareius* (Schneider)

This fish is dark in color and is marked by a pale line along the base of the anal and caudal fins which grows wider as it approaches the posterior edge of the fin.

This fish is uncommon in the Hawaiian Islands. It is distributed throughout the East Indies, Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands.

Surgeon Fish

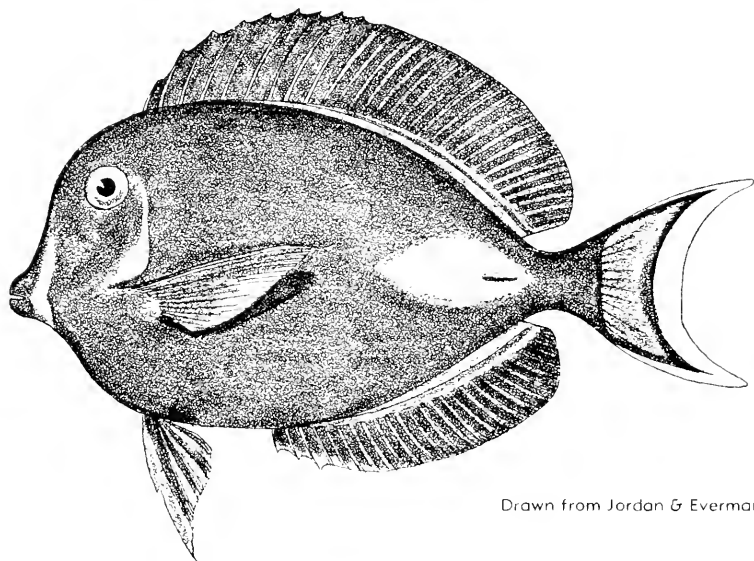
104-12 *Hepatus leucosternon* (Bennett)

This surgeon fish measures about ten inches in length and is an uncommon species in the Hawaiian Islands. It is found throughout the East Indies, Melanesia, and Polynesia as far as the Hawaiian Islands.

Pakuikui or Achilles' Tang

104-13 *Hepatus achilles* (Shaw)

Plate VI, Figure 7



Drawn from Jordan & Evermann

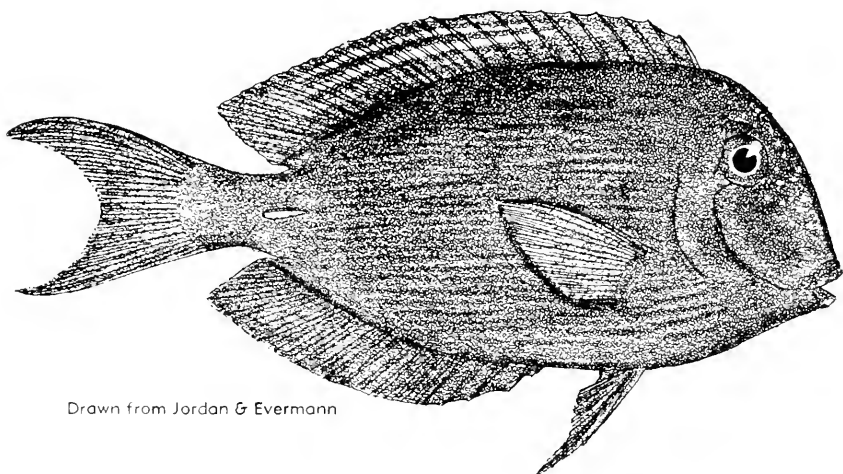
The body of this surgeon fish is almost black in color and is marked by a bright, scarlet spot at the base of the tail and another on the tail fin. A bluish spot marks the chin and the area beneath the eye. The bases of the dorsal and anal fins are also marked by bluish lines. This

fish reaches a length of about ten inches, is common about our reefs, and is one of the most spectacular of our reef fishes.

It is found along the coast of China, throughout Micronesia and Polynesia as far north as the Hawaiian Islands.

Kala

104-14 *Ctenochaetus strigosus* (Bennett)



Drawn from Jordan & Evermann

The kala is of a coppery red color and is marked by about thirty horizontal light blue lines. It is easily recognized by its bristle-like teeth and is reported to be herbivorous in its habits. It will reach ten inches in length.

A common species, it was reported to be tabu in ancient times to all but the king. He ate it raw and put to death all who made the mistake of taking it for their own use.

This fish is distributed from the Red Sea and Zanzibar to Ceylon and the East Indies, through Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands.

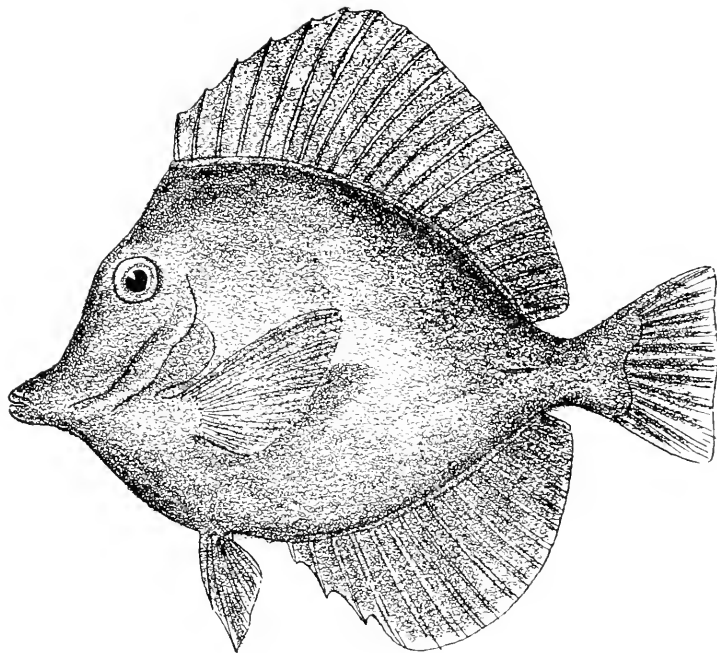
Lauipala

Also known as the Yellow Tang or Yellow Surgeon Fish

104-15 *Zebrasoma flavescens* (Bennett)

Plate VI, Figure 4

This surgeon fish is one of the most brilliantly colored fishes in the world, for it is marked by a brilliant chrome yellow color over its entire



Drawn from Jordan & Evermann

body. A common species in Polynesian waters it appears to be brownish in color in all areas except the Hawaiian Islands.

The laupala is distributed from the East Indies through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

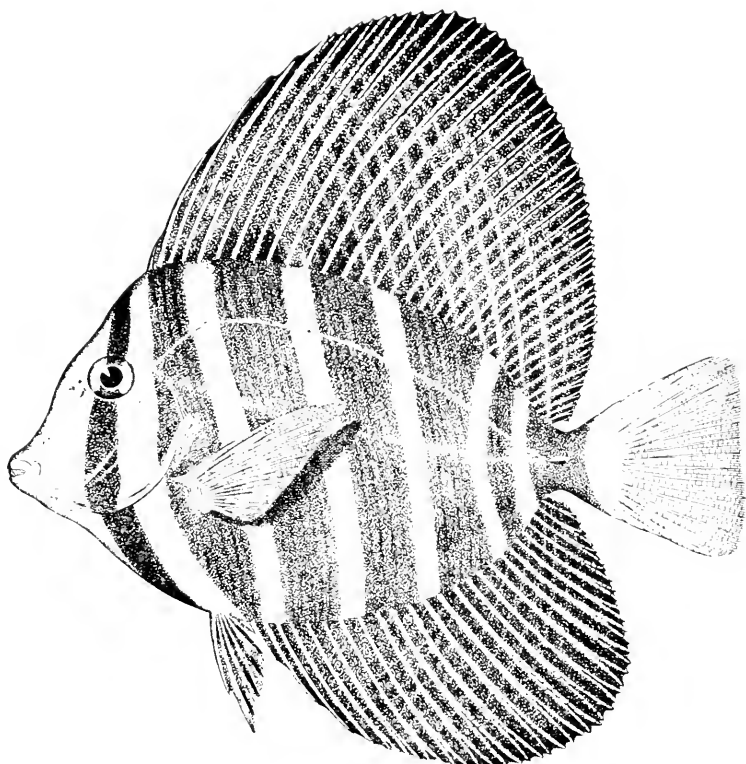
Kihikihi or Api Fish

Also known as the Sailfin Tang or Kihikihi Launui

104-16 *Zebrasoma veliferum* (Bloch)

This surgeon fish is remarkable for its very large and fanlike dorsal and anal fins. The body of this fish is marked by a series of six or seven whitish vertical bands of color. This fish is able to change its color and will show various depths of color from a deep gray to almost white. It will reach a length of about sixteen inches. A common species in Samoan waters, it is rather uncommon in Hawaiian waters.

This surgeon fish is distributed from Madagascar, Mauretius, the Bourbons, and the Seychelles, through the East Indies, Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands.

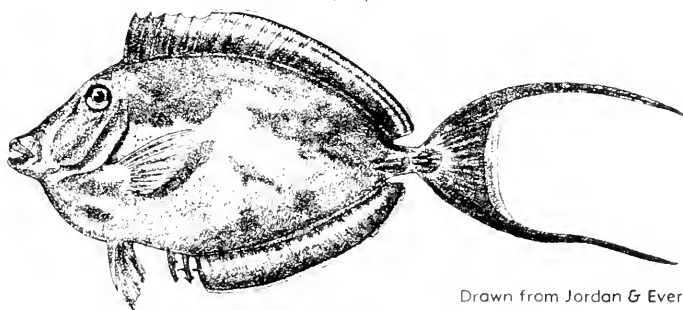


From Jordan & Evermann

Kala, Unicorn Fish, or Umaumalei

104-17 *Naso lituratus* (Schneider)

Plate VI, Figure 1



Drawn from Jordan & Evermann

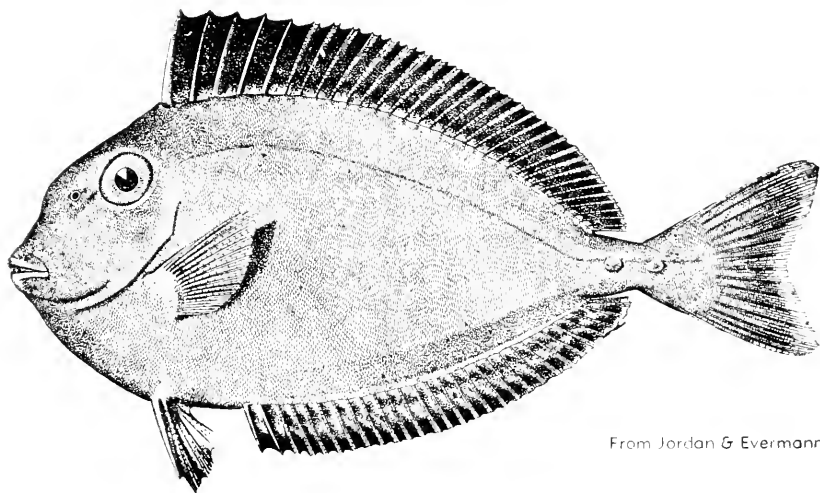
This fish varies in color and is also able to change its color somewhat. It is usually of a dark color above and becomes an olive color over most

of the body. The head, the fins, and the tail are marked with yellow. The tail also bears two pairs of spines. The males of the species have a long filament on the tail. This fish will reach a length of twelve inches. It is one of the most common members of the family.

This fish is widely distributed in the tropics. It is found from the Suez Canal, the eastern coast of Africa and Mauretius, through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Unicorn Fish

104-18 *Naso annulatus* (Quoy & Gaimard)



From Jordan & Evermann

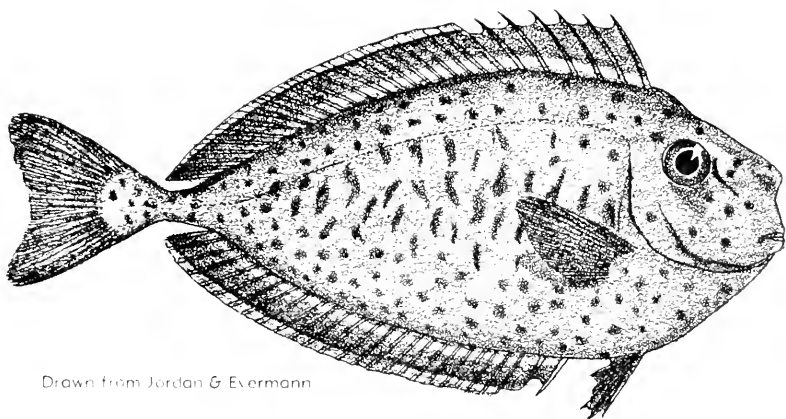
This surgeon fish reaches a length of about twelve inches. It is found from Zanzibar through the East Indies, along Queensland and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Kalaholo, Kalalolo, Kala, or Unicorn Fish

104-19 *Naso brevirostris* (Valenciennes)

The fish is usually a dull drab or brownish color and is covered with dark spots. It is marked on the head with a horn which also varies in size. It will reach a length of about twelve inches.

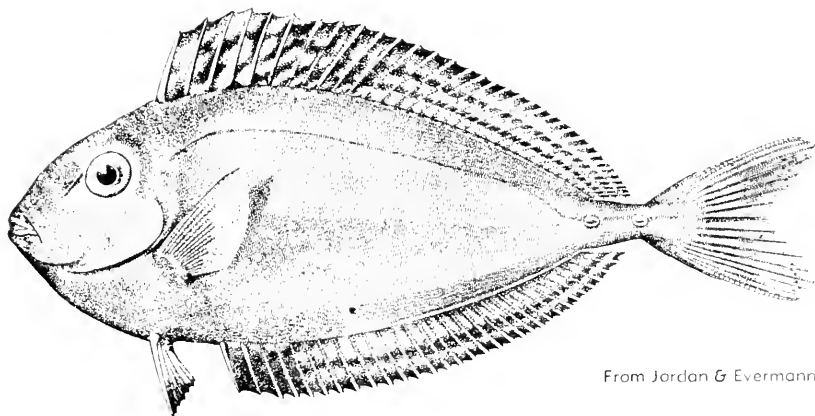
This surgeon fish is found from Mauretius to Ceylon, through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.



Drawn from Jordan & Evermann

Unicorn Fish

104-20 *Naso hexacanthus* (Bleeker)



From Jordan & Evermann

This surgeon fish is uniformly grayish brown in color. It is one of the largest members of the family and will reach a length of thirty inches. It is a good food fish and is commonly seen on the market.

It is distributed through the East Indies, Micronesia, and extends as far as the Hawaiian Islands.

Kala or Unicorn Fish

104-21 *Naso unicornis* (Forsk.)

The body of this fish is a dirty olive brown color in life and is darker above than beneath. The dorsal fin is marked with bluish and yellowish

lines. The head of this fish bears a horn and the tail bears two pairs of spines. This fish is one of the most common horned species and will reach a length of about fourteen inches.

This species is widely distributed in the Pacific and Indian Oceans. It is found from the Red Sea, Maurelius, and the Bourbons through Ceylon, the East Indies, Japan, Queensland, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

THE SCORPION FISH OR ROCK FISH FAMILY

Also known as the Red Rock Cod Family

105 *Family Scorpaenidae*

The members of the scorpion fish family are nearly all of fair size and are commonly used as food. One of the distinctive features of the family is the strong bone under the skin which extends from under the eye across the cheek. Many members of the family have venom sacs at the bases of the dorsal spines and some of the species have dermal flaps over their bodies. Many of these fishes are viviparous and give birth to the young when the young have reached about one-fourth of an inch in length.

The members of the family inhabit all seas, but they are especially abundant in the temperate parts of the Pacific where they form a large part of the fish fauna. They are non-migratory and seem to live about rocks. They are easily taken by fishermen from deep water with hook and line.

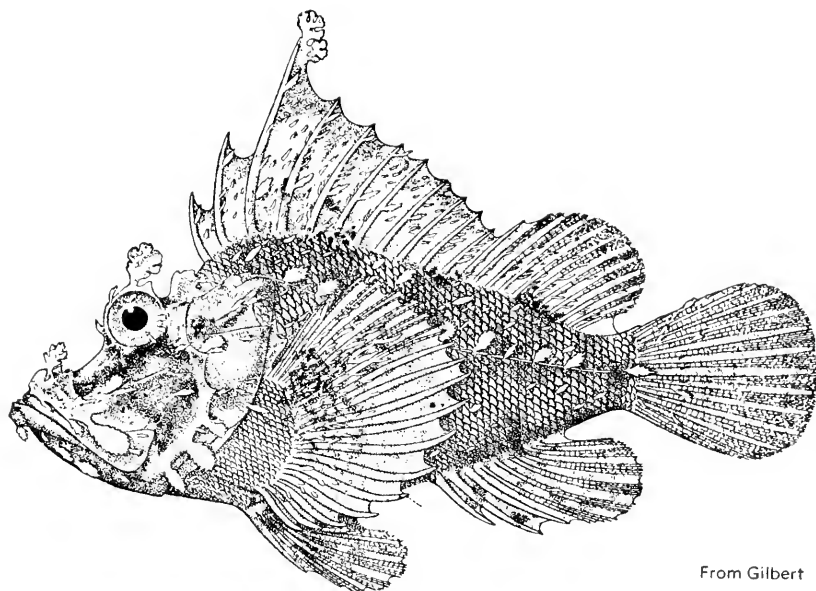
Of more than 250 known species, about twenty are known from Hawaiian waters.

Deep Water Scorpion Fish

105-1 *Peloropsis xenops* Gilbert

This deep water fish is of a bright vermillion color and is spotted with olive-brown, purplish, and yellowish markings. The body was covered with a number of dermal flaps and measured about six inches in length.

This species is known from a single specimen taken in Auau Channel off Maui and Lanai between 32 and 43 fathoms.

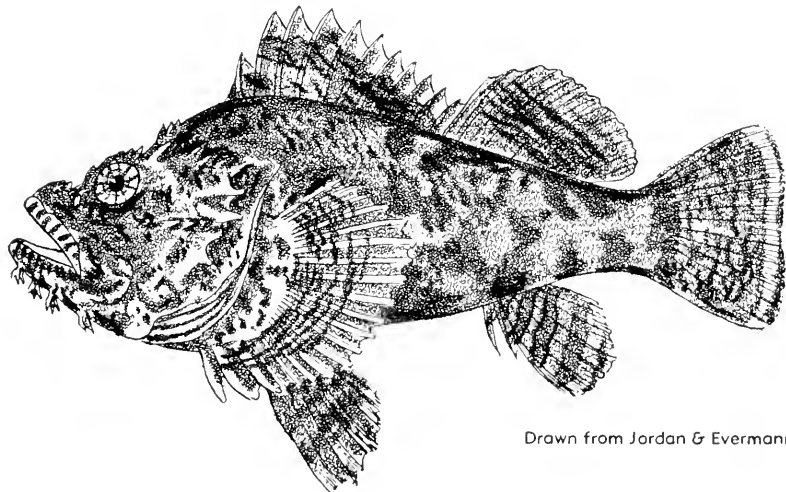


From Gilbert

Nohu

105-2 *Scorpaenopsis cacopsis* Jenkins

Plate VI, Figure 6



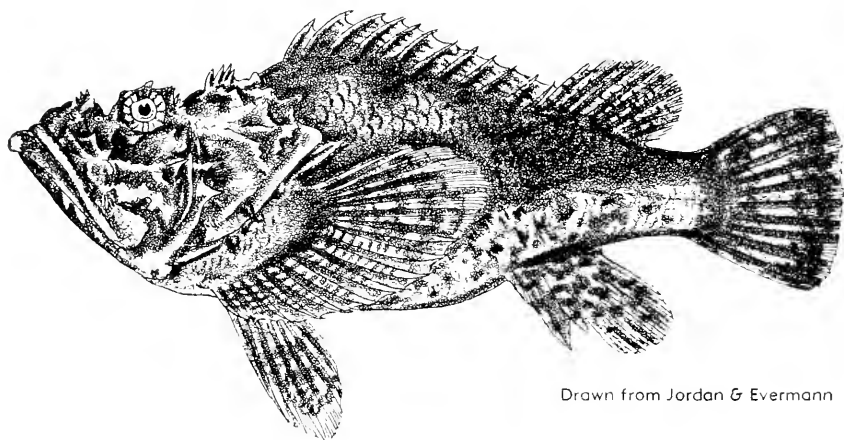
Drawn from Jordan & Evermann

This scorpion fish is of an uneven, rusty, reddish-brown color in life. It is unevenly spotted and blotched and is lighter in color beneath. It will reach a length of twenty inches.

It is found in the Society Islands and in Hawaiian waters.

Nohu or Omaka

105-3 *Scorpaenopsis gibbosus* (Schneider)



Drawn from Jordan & Evermann

This fish is very unevenly colored in life. It is mottled, streaked, and spotted with dark purplish brown in some areas and is almost white in others. A fairly common species it reaches a length of about ten inches.

This scorpion fish is widely distributed throughout Melanesia, Micronesia, and Polynesia as far north as the Hawaiian Islands.

Scorpion Fish

105-4 *Sebastapistes nuchalis* (Gunther)

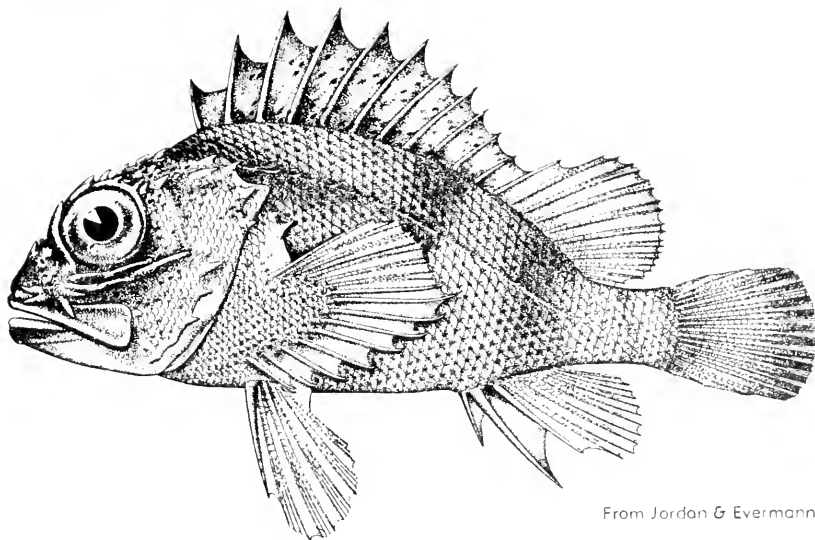
An uncommon scorpion fish, it presents a marbled color pattern over the body and may be best recognized by an irregular black blotch on the head and by a black area on the dorsal fin between the third and fifth spines. The dermal flaps are moderately well developed.

It measures about three inches in length and is known from southern Polynesia and the Hawaiian Islands.

Scorpion Fish

105-5 *Sebastapistes albobrunneus* (Gunther)

The body of this scorpion fish varies in color but is usually a light olive and is marked with darker markings. The fins are covered with



From Jordan & Evermann

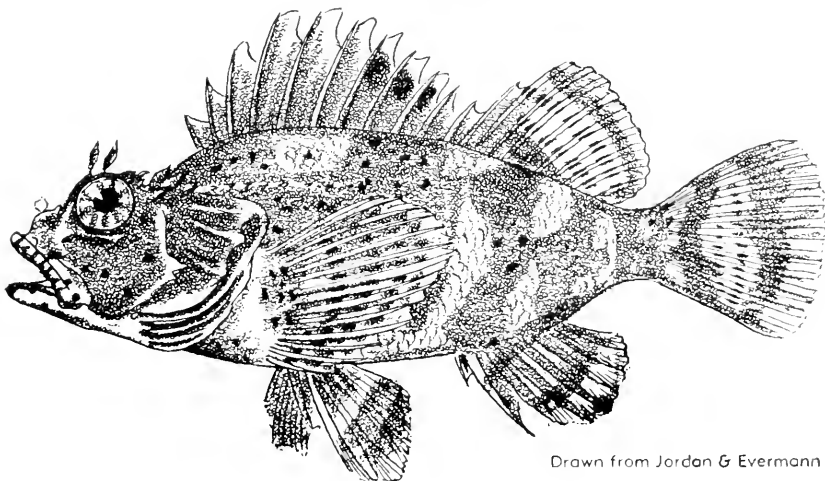
small, brown spots. A small fish measuring about two inches in length, it is one of the most abundant about our reefs.

It is distributed throughout Micronesia and Polynesia as far northward as the Hawaiian Islands.

Poopaa

105-6 *Sebastapistes asperella* (Bennett)

Plate VI, Figure 8

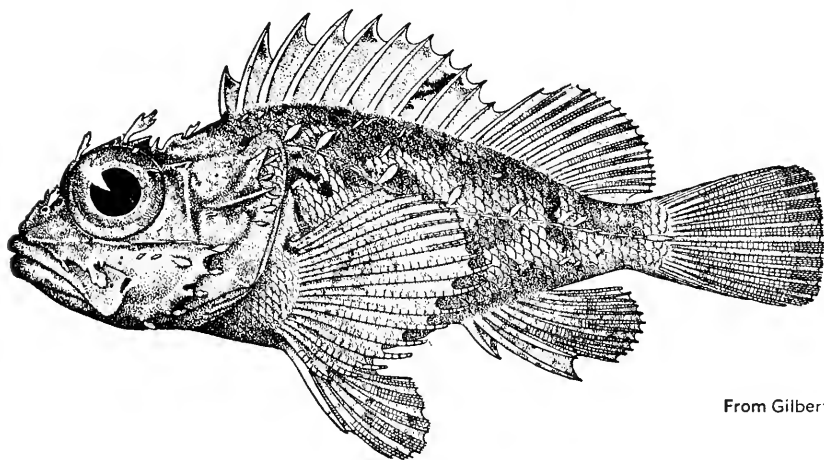


Drawn from Jordan & Evermann

The body of this fish is mottled with reddish, brownish, and whitish areas and is marked by a few scattered dermal flaps. It reaches a length of about six inches. It is distributed through Micronesia and Polynesia as far north as the Hawaiian Islands.

Scorpion Fish

105-7 *Sebastapistes bynoensis* (Richardson)



From Gilbert

This scorpion fish is of a reddish-brown mottled color and is covered by scattered dermal flaps. It reaches a length of three inches and lives from the surface down to depths of 73 fathoms.

It is found from the Red Sea through Micronesia and Polynesia as far northward as the Hawaiian Islands.

Scorpion Fish

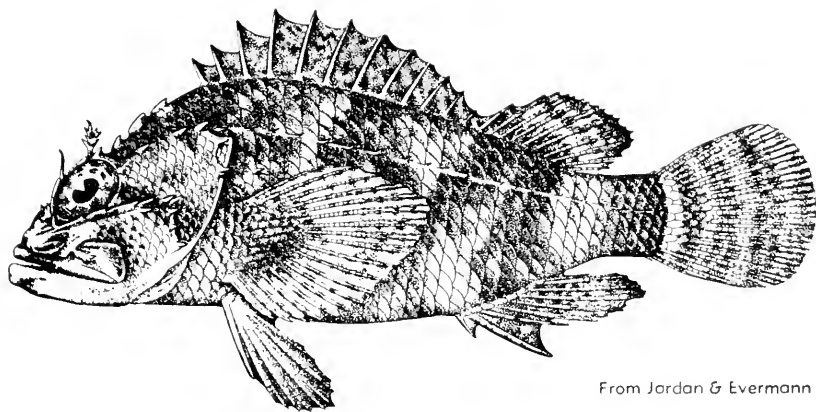
105-8 *Scorpaenodes parvipinnis* (Garrett)

This fish is of a dull color and is marked by dark bars on the ends of the pectoral and ventral fins. It measures about three inches in length. It is known from Hawaii and southern Polynesia.

Kellogg's Scorpion Fish

105-9 *Scorpaenodes kelloggi* (Jenkins)

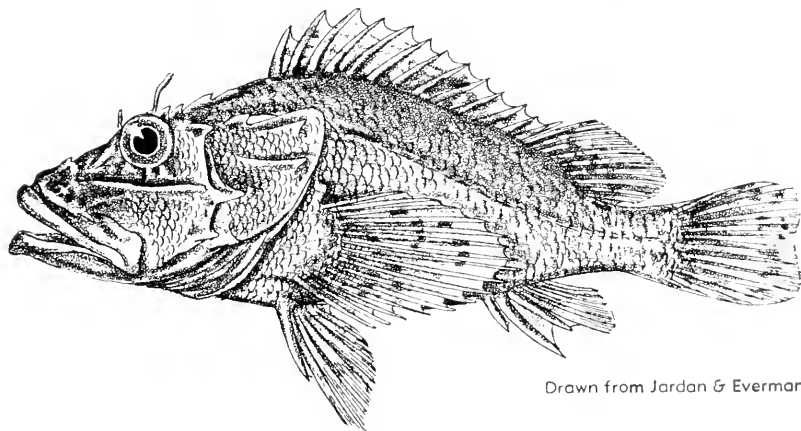
This fish is known from Hawaiian waters by a very few specimens measuring about two inches in length. It is marked by a series of three bands beginning on the dorsal fin and extending onto the body.



From Jordan & Evermann

Oopu Kai or Nohu

105-10 *Merinthe macrocephala* (Sauvage)



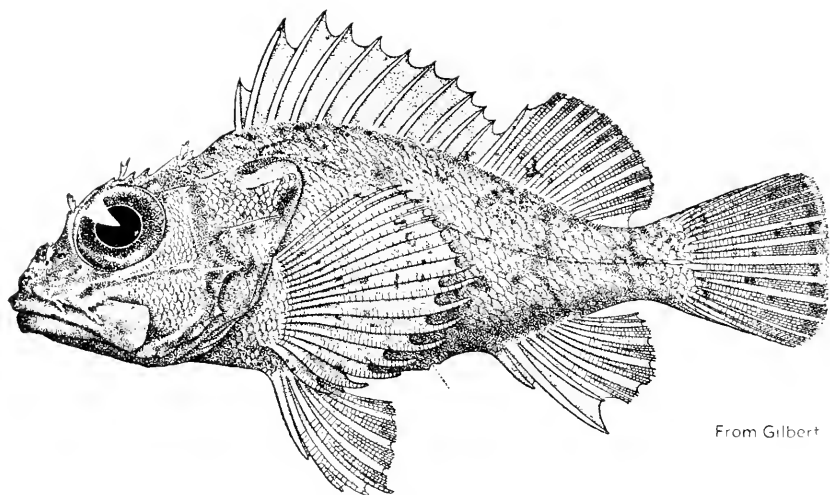
Drawn from Jordan & Evermann

This scorpion fish is mottled in color, reaches a length of about ten inches, and will weigh four or five pounds. It is known only from the Hawaiian Islands.

Scorpion Fish

105-11 *Helicolenus rufescens* Gilbert

This scorpion fish is dull in color, is blotched with vermillion and white, and is marked by a few scattered dermal flaps on the head. It reaches a length of four inches.

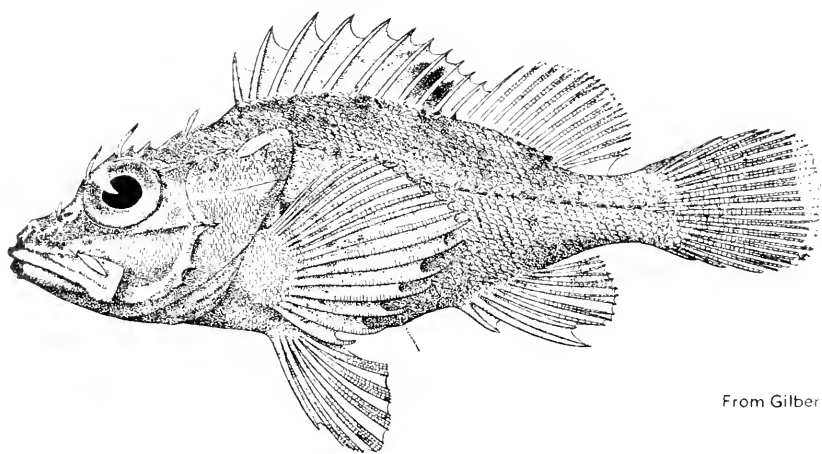


From Gilbert

It is known from only two specimens taken off the coasts of Kauai and Maui between 41 and 165 fathoms.

Scorpion Fish

105-12 *Pontinus spilistius* Gilbert



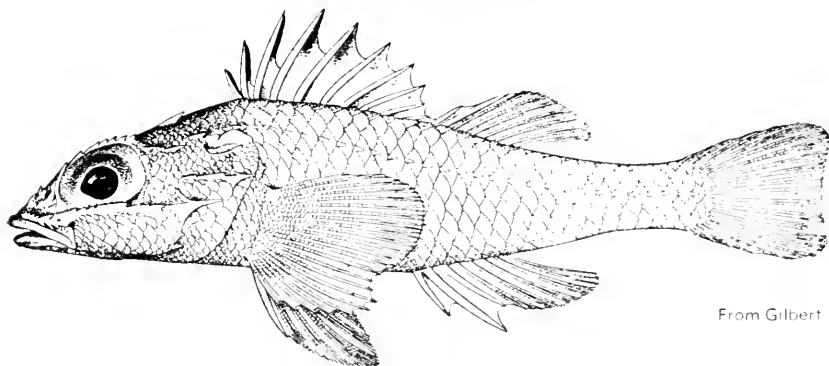
From Gilbert

This scorpion fish is reddish in color in life and is mottled in appearance. It is marked by a black spot on the dorsal fin and by a few dermal flaps on the head.

It is known from a single specimen measuring about four inches taken off the northwest coast of Maui between 78 and 85 fathoms.

Scorpion Fish

105-13 *Plectrogenium nanum* Gilbert

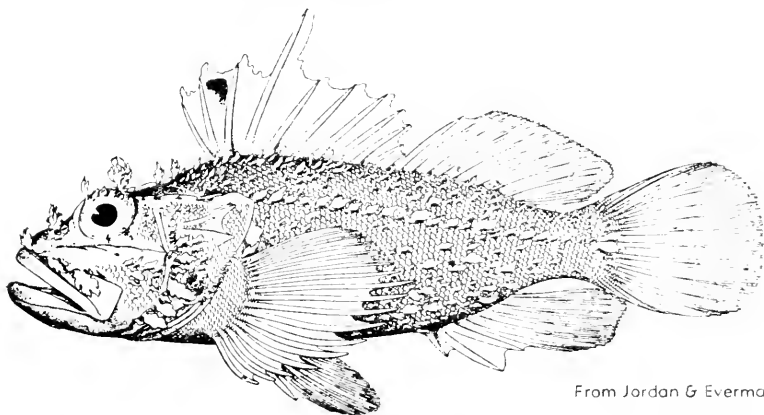


From Gilbert

This scorpion fish is of a uniform rose red color in life and measures about three inches in length. It is known from fifteen specimens taken in Hawaiian waters between 143 and 357 fathoms.

Scorpion Fish

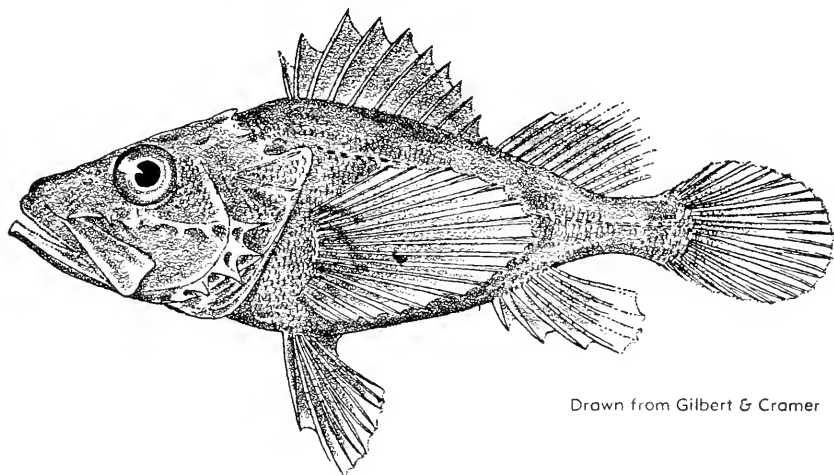
105-14 *Iracundus signifer* Jordan & Evermann



From Jordan & Evermann

This fish is reported to have been reddish in life and marked with a black spot on the front part of the dorsal fin. It was covered with dermal flaps and measured about four inches in length. It is known only from the Hawaiian Islands.

Scorpion Fish

105-15 *Setarches remiger* (Gilbert & Cramer)

Drawn from Gilbert & Cramer

This rare scorpion fish is known only from the Hawaiian Islands. It measured about four inches in length and was taken in deep water between 97 and 352 fathoms.

Lion Fish or Turkey Fish

105-16 *Pterois radiata* Cuvier

The body of this fish was generally brown in color and was marked with light edged bands of color scattered over the body. It reaches a length of about six inches.

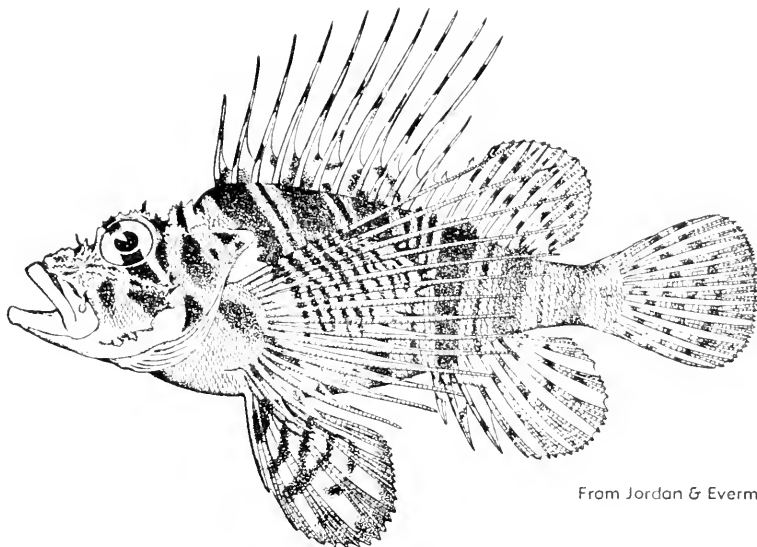
Lion Fish, Turkey Fish, or Featherfish

105-17 *Pterois sphex* Jordan & Evermann

This fish is rather unusual because the spines which support the dorsal and pectoral fins are long and slender and extend beyond the margin of the fin. The body is marked with bars and bands and measures about six inches in length.

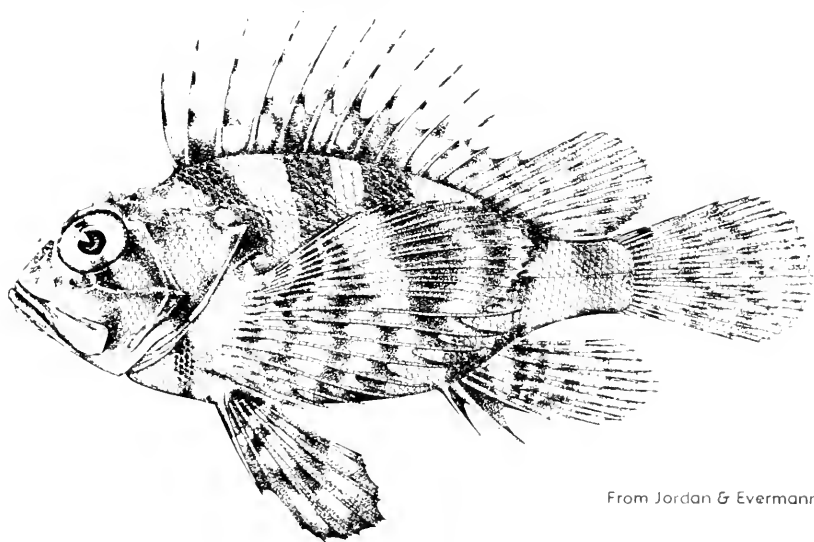
The spines in the fins of these fishes are very strong and sharp and inflict severe wounds on the creatures which come too close. They are reported to contain a poison. In young fishes the rays of the fins do not protrude as far beyond the membranes as they do in older fishes.

This fish is found only in the waters surrounding the Hawaiian Islands.



From Jordan & Evermann

Short Finned Scorpion Fish
105-18 *Dendrochirus brachypterus* (Cuvier)
Plate VI, Figure 9



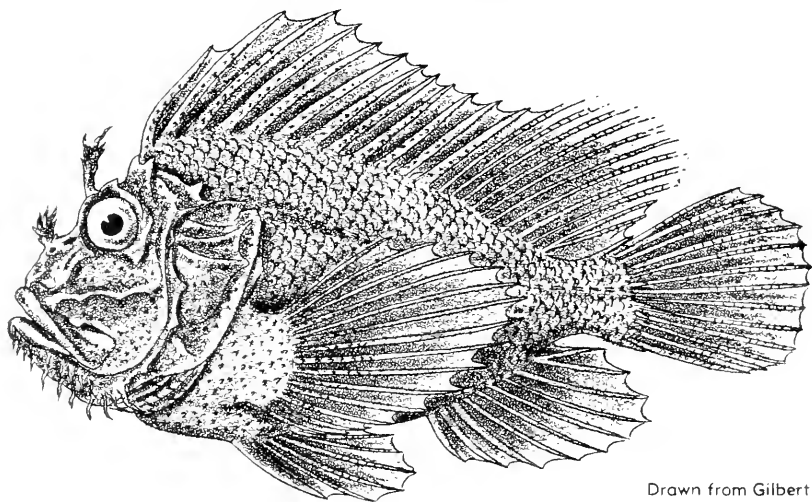
From Jordan & Evermann

The body of this little scorpion fish is marked with six dark olive bands with red and whitish intervals. It measures about six inches in length.

This scorpion fish is found from Zanzibar and the Red Sea through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Scorpion Fish

105-19 *Taenianotus triacanthus* Lacepede



Drawn from Gilbert

This scorpion fish is lemon yellow in color and is clouded with pale brownish markings. There appear to be two color varieties of this fish. One is yellow and the other is a black variety. It measures about four inches in length.

This species is distributed from the East Indies through Polynesia as far as the Hawaiian Islands.

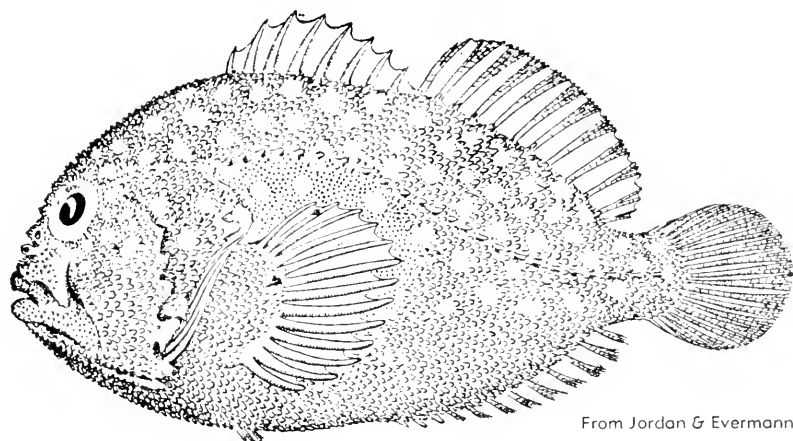
THE CARACANTHID FISH FAMILY

106 Family *Caracanthidae*

This rare family of fishes is a small group with compressed bodies, small fins, and a skin which is rough and covered with prickles. They are usually brown in color and are marked with pale brown spots. These fishes live among the coral reefs and rocks of the Pacific and Indian Oceans. The members of this family are rare and are not well known.

Only two members of this family are known from the Hawaiian Islands.

Spotted Caracanthus

106-1 *Caracanthus maculatus* (Gray)

From Jordan & Evermann

This interesting little fish reaches a maximum length of two inches. It inhabits the coral rocks and reefs about Hawaii and is reported to be abundant at Honolulu and along Waikiki reef.

It is widely distributed in the Pacific Ocean. It ranges from Madagascar to Micronesia and Polynesia and as far northward as the Hawaiian Islands.

Caracanthid Fish

106-2 *Caracanthus unipinna* (Gray)

This little fish very closely resembles the preceding species, but it may be recognized by the fact that its dorsal fins are fully united and their separation is not marked by a notch as in the preceding species. A very small fish, it is uniformly brownish in color.

It is distributed from Zanzibar, Madagascar, and Keeling through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

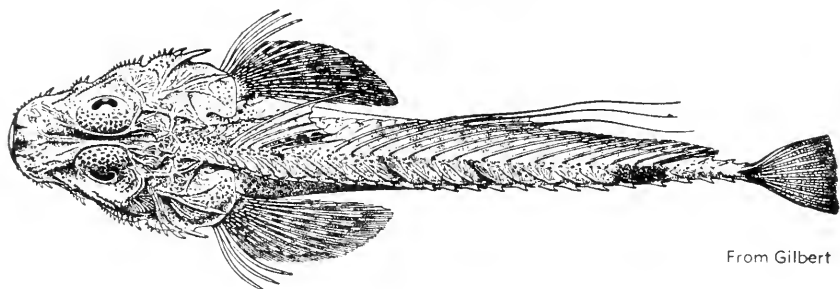
THE RAT TAIL OR NEZUPO FISH FAMILY

107 Family *Hoplichthyidae*

The rat tail fishes comprise a very small family in which the body has an armament of rough plates.

Only two Hawaiian species are known; both are from deep water.

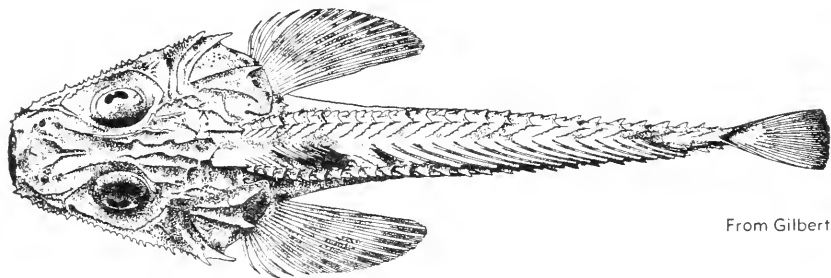
Hawaiian Rat Tail Fish

107-1 *Hoplichthys citrinus* Gilbert

From Gilbert

This fish in life is a bright lemon or orange-yellow color above and silvery-whitish below. It reaches a length of about seven inches. It is a deep water fish and was taken between 116 and 220 fathoms. A rare fish, it is known only from the Hawaiian Islands.

Deep Water Rat Tail Fish

107-2 *Hoplichthys platophrys* Gilbert

From Gilbert

This rare fish is known from a single specimen dredged off Laysan Island in 351 fathoms. It measured about three inches in length.

THE FLAT HEAD OR KOCHI FISH FAMILY

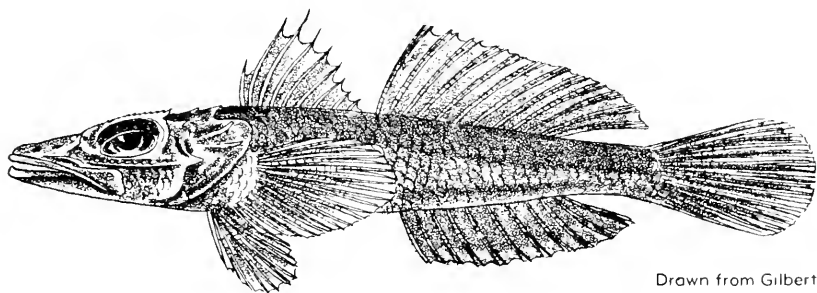
108 Family *Platycephalidae*

The fishes of this family are all spindle-shaped with flattened, rough heads. Their bodies are covered with small, rough scales. The flattened head enables one to separate this family from the scorpion fishes.

The members of this family are well represented in the East Indian region and are there valued as food.

While over fifty species are known from the East Indies, only one is known from the Hawaiian Islands.

Hawaiian Flat Head Fish
108-1 *Bembradium roseum* Gilbert



Drawn from Gilbert

This little fish, measuring about four inches in length, was described as having an olive ground color and marked with reddish above. This fish is known from only two specimens which were dredged in Pailolo Channel between Molokai and Maui in 138 fathoms of water.

THE DEEP WATER GURNARD OR
DEEP WATER SEA ROBIN FAMILY

109 Family *Peristediidae*

The members of this family are all deep sea fishes and are taken only in dredges. They have a flat, depressed head, a bony coat of mail, and two feelers on the pectoral fin. They are generally reddish in color. A bizarre group of fishes, they somewhat resemble young sturgeons.

Of about thirteen known species, only two are known from the Hawaiian Islands.

Hawaiian Deep Water Gurnard
109-1 *Peristedion engyceros* (Günther)

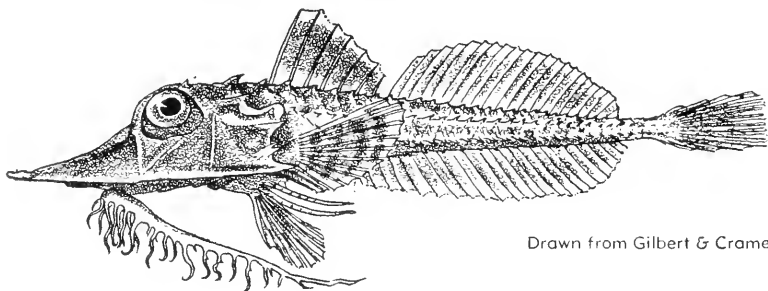


Drawn from Jordan & Evermann

This deep sea gurnard is pinkish in color with a yellowish tinge and measures about ten inches in length. It is abundant about the Hawaiian Islands on sandy bottoms between 150 and 250 fathoms. It is known only from the Hawaiian Islands.

Deep Water Gurnard

109-2 *Peristedion bians* Gilbert & Cramer



Drawn from Gilbert & Cramer

This deep sea gurnard is a dull reddish color in life and measures about eight inches in length. It occurs at depths of 165 to 459 fathoms and is known only from the Hawaiian Islands.

THE TRUE GURNARD FAMILY

110 *Family Triglidae*

The true gurnards look somewhat like butterflies because of their large and brightly colored pectoral fins. Their heads are bony and rough and their bodies are covered with rough scales. This fish possesses three free rays beneath the pectoral fin which are used as feelers as the fish crawls along the bottom. With these feelers it turns over stones, explores shells, and searches for food.

Of the numerous species found in warm seas, only one is known from the Hawaiian Islands.

Gurnard

110-1 *Chelidonichthys kumu* (Cuvier)

This gurnard is a large fish measuring about six or more inches in length. The pectoral fins of this fish are large and are of a brilliant, variegated blue color like the wings of a butterfly.

Common in Japan, this fish is found southward along China, Australia, and New Zealand, and northeastward to the Hawaiian Islands.

THE FLYING GURNARD FAMILY

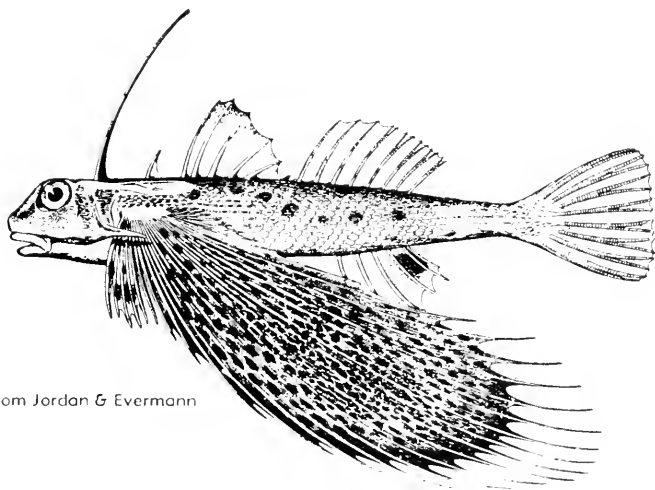
111 Family Cephalacanthidae (*Dactylopteridae*)

The flying gurnards are described as among the most fantastic inhabitants of the sea. They have a short and bony head, a coat of firm scales over the body, and long and wing-like pectoral fins. These fins are divided into two parts. The first part is composed of rays which are used somewhat as legs and serve to hold the creature off the sand and to feel about for food. The second part of the fin is long and wing-like and reaches to the end of the body. These fins are beautifully colored with blue and brownish-red and serve as wings when the fish glides above the water.

The gurnards are able to sail through the air somewhat like the flying fishes but for much shorter distances.

The family is a small one and is distributed in warm seas. It contains but a single genus and from two to four species, one of which occurs in the Hawaiian Islands.

Pacific Flying Gurnard or Loloau

111-1 *Dactyloptera orientalis* (Cuvier)

From Jordan & Evermann

The common flying gurnard is of a dull drab color above and whitish beneath. The body and the pectoral fins are marked with orange and golden spots. It reaches a length of fourteen inches.

This fish is distributed from Mauretius and the Cape of Good Hope through the East Indies, along China and Japan, and into Melanesia and Polynesia as far northward as the Hawaiian Islands.

THE DEMOISELLE OR DAMSEL FISH FAMILY

Including the Rock Pilots and Sergeant Majors

112 Family *Pomacentridae* (*Abudefdufidae*)

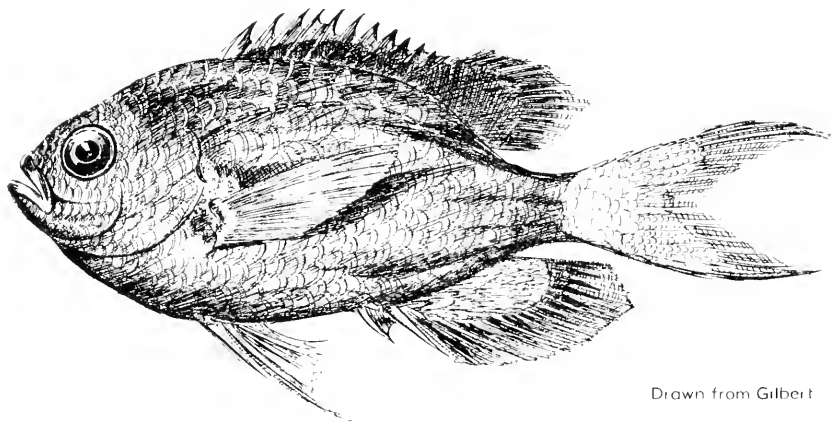
The demoiselle fishes are very active, brilliantly colored fishes of the tropical seas. They are marked with brilliant metallic blue, orange, or scarlet colors and measure only a few inches in length.

They make their homes in the tropical seas although some species occur north of the Tropic of Cancer. In their manner of life they resemble the butterfly fishes. They feed on small marine animals and plants and live an active, exciting existence along the shore line. Here they swim about in rocky basins, among the coral, and in the pools. They are often found in coral heads where they are safe from their enemies.

At least eighteen members of this family are known from Hawaiian waters.

Little Damsel Fish

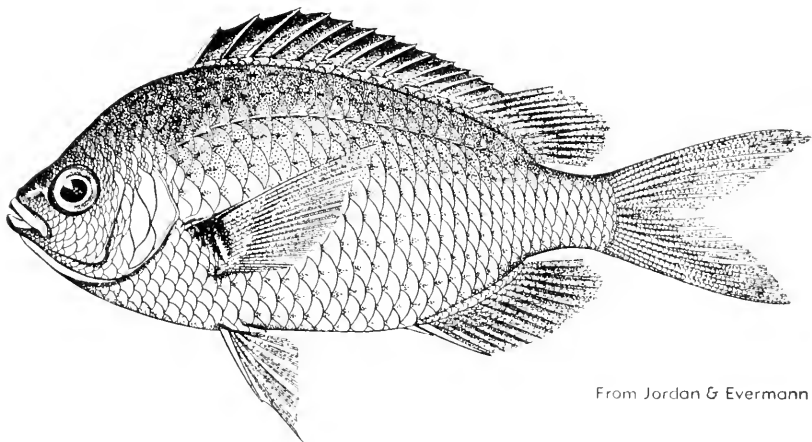
112-1 *Chromis dimidiatus* (Klunzinger)



Drawn from Gilbert

This fish measures about four inches in length. It is distributed from the Red Sea through the East Indies and throughout Polynesia as far as the Hawaiian Islands.

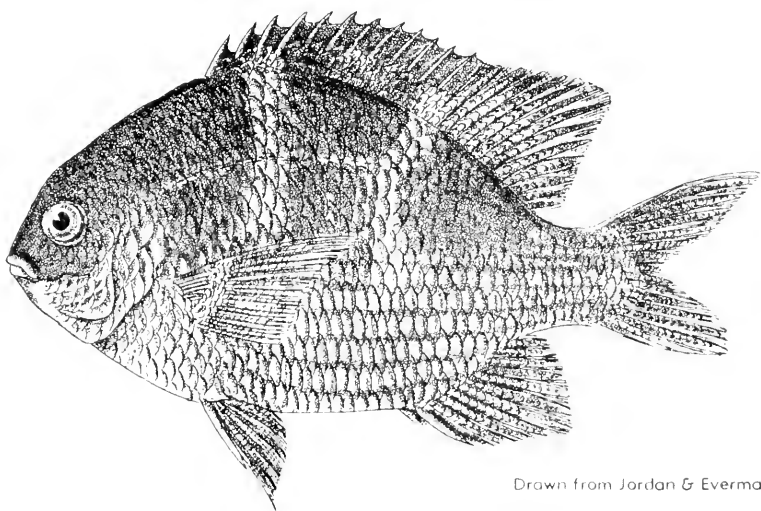
Damsel Fish
112-2 *Chromis velox* Jenkins



From Jordan & Evermann

This fish measures six inches in length. An uncommon species it is known only from the Hawaiian Islands.

Sindo's Damsel Fish
112-3 *Chromis sindonis* (Jordan & Evermann)



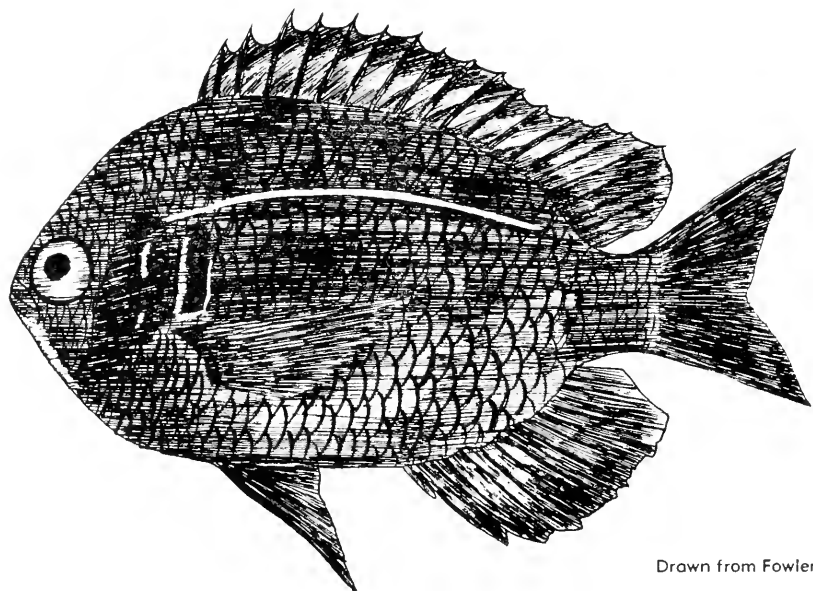
Drawn from Jordan & Evermann

This damsel fish is dark in color over the upper part of the body. It is marked by two vertical stripes on the side of the body. It reaches about four inches in length and is known only from the Hawaiian Islands.

It was named for Mr. Michitaro Sindo who discovered it at Kailua, Oahu.

Damsel Fish

112-4 *Chromis verater* Jordan & Metz



Drawn from Fowler

This species measures about six inches in length. It is known only from the Hawaiian Islands.

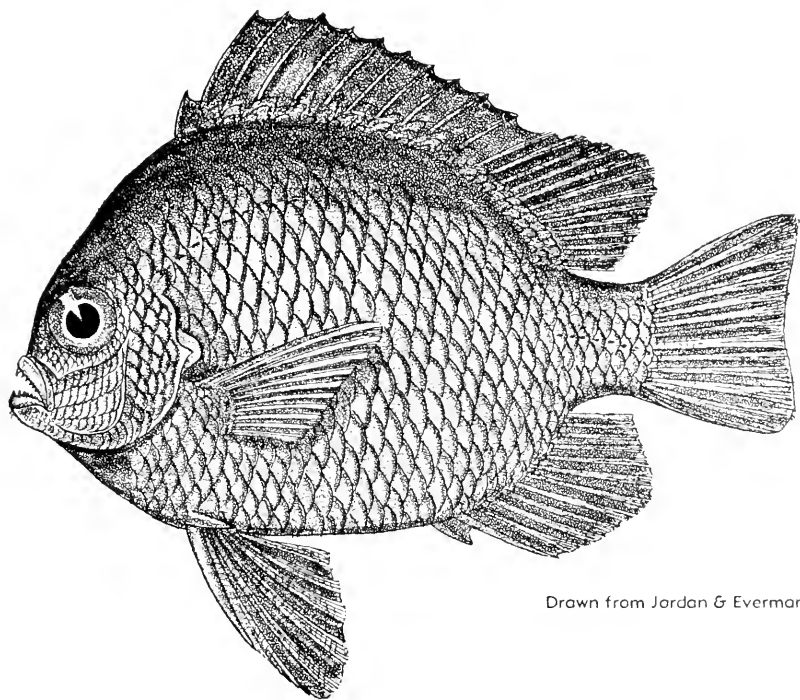
Damsel Fish

112-5 *Dascyllus aruanus* (Linne)

This species is a grayish color in life and has the body marked by black cross bands. It lives in the crevices and passages among the coral heads. It is small in size.

This fish is found from the Red Sea, East Africa, and Mauretius, through India, the East Indies, along China and Queensland, and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Aloiloi-paapaa

112-6 *Dascyllus trimaculatus* (Ruppell)

Drawn from Jordan & Evermann

This damsel fish has a high, compressed body and reaches a length of about six inches. The scales which cover the body are blackish on their border and white at their base. A pretty, active little fish, it is common in crevices about the coral reefs.

This fish is found from the Red Sea, Mauretius, and the eastern coast of Africa through India, the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Damsel Fish

112-7 *Dascyllus marginatus* (Ruppell)

This damsel fish reaches a length of about six inches. It is found from the Red Sea, Mauretius and Madagascar, through India, the Andaman Islands, the East Indies, China, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

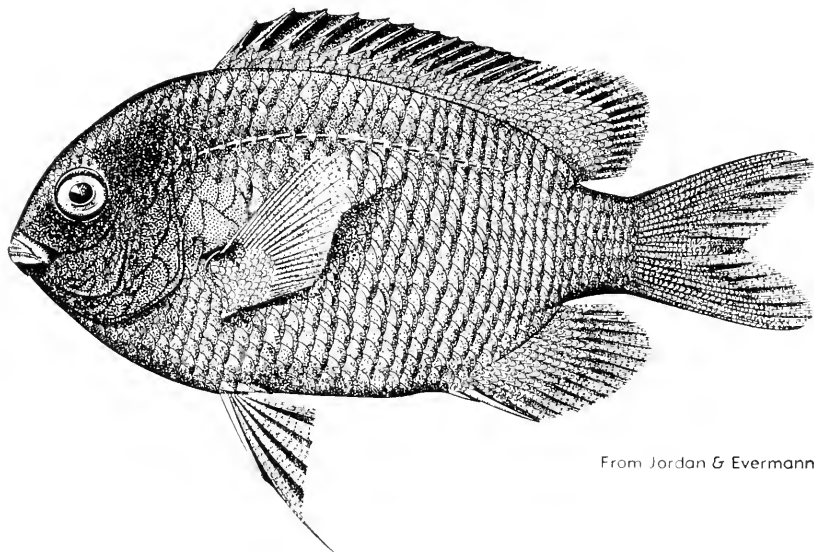
Damsel Fish

112-8 *Pomacentrus nigricans* (Lacepede)

This species measures about six inches in length. It is distributed through the East Indies, along China, and through Micronesia and Polynesia as far as the Hawaiian Islands.

Damsel Fish

112-9 *Pomacentrus inornatus* De Vis



From Jordan & Evermann

This damsel fish is one of the most common members of the family in the Hawaiian Islands. It is a dark drab color in life and is covered with scales which are edged with black forming darker bands on the body. It reaches a length of five inches.

This fish is known only from Oceania. It is distributed throughout southern Polynesia and extends as far northward as Laysan Island in the Hawaiian group.

Black Demoiselle

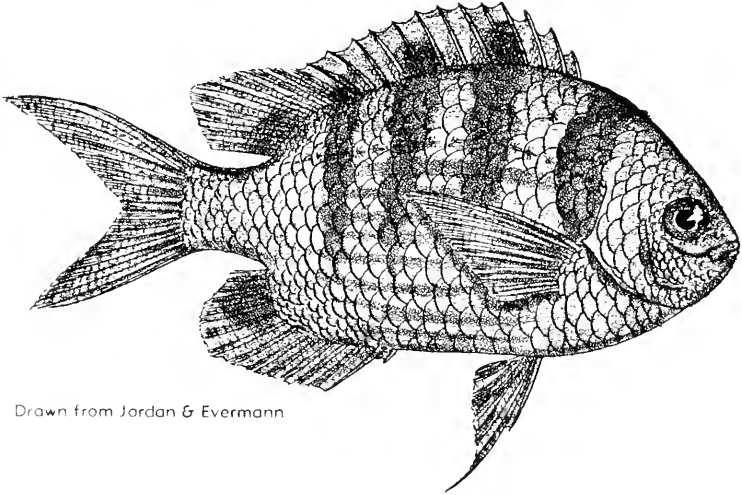
112-10 *Abudefduf melas* (Cuvier)

This fish is uniformly black in color and measures about six inches in length.

This species is distributed from the Red Sea and Zanzibar through the East Indies, Riu Kiu, Melanesia, and the Hawaiian Islands.

Maomao

112-11 *Abudefduf abdominalis* (Quoy & Gaimard)



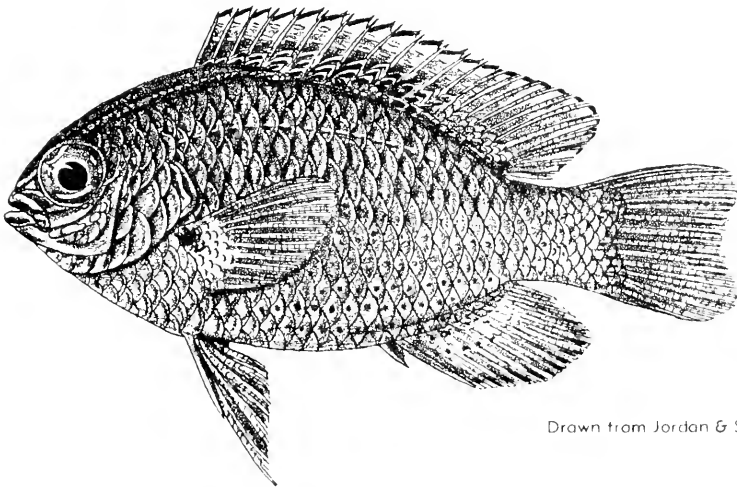
Drawn from Jordan & Evermann

The body of this damsel fish is brassy green in life and is marked with four or five bluish black vertical bands. It will reach a length of about nine inches and is a fairly common species in Hawaiian waters.

This fish is distributed from southern Polynesia to the Hawaiian Islands.

Damsel Fish

112-12 *Abudefduf biocellatus* (Quoy & Gaimard)



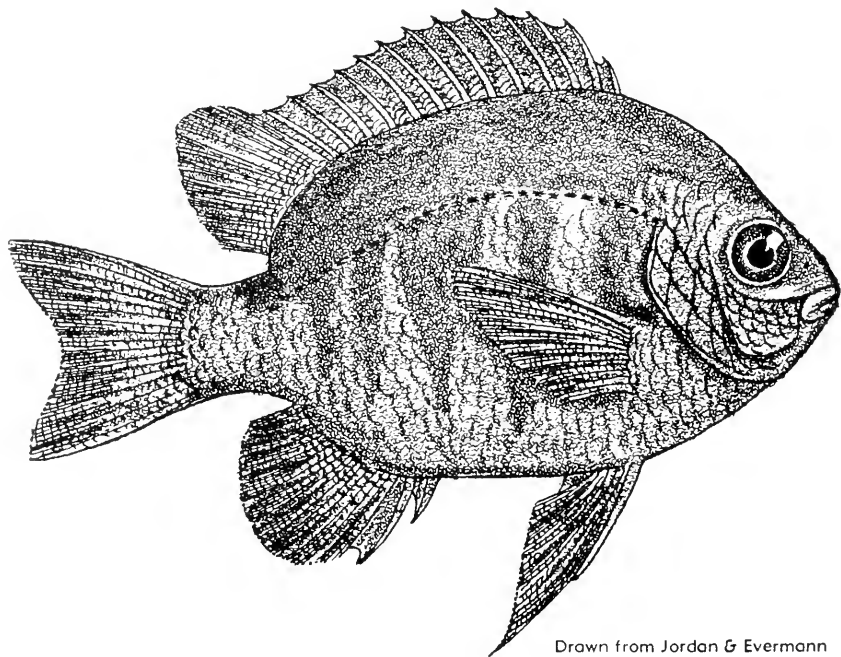
Drawn from Jordan & Seale

This fish is uniform in color but for a pair of round spots, the first at the base of the last dorsal spines, the second at the base of the last dorsal rays. It reaches a length of two inches.

This fish is found from East Africa and Mauretius through India, the Andaman Islands, Nicobar, the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Kupipi or Oonui Aoao Nui

112-13 *Abudefduf sordidus* (Forsk.)

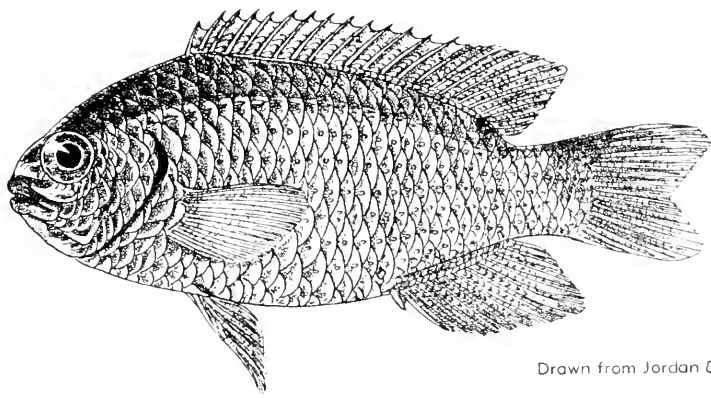


Drawn from Jordan & Evermann

The kupipi is a silvery gray color above, white beneath, and is marked with six pale vertical bands and also by a black spot on the caudal peduncle just behind the dorsal fin. It reaches a length of about eight inches and is commonly sold as a food fish. The young may be found in tide pools which are filled by the spray.

This fish is distributed from the Red Sea, Zanzibar, and Mauretius through all of the islands to the East Indies, along China and Queensland, and throughout Melanesia and Polynesia as far as the Hawaiian Islands.

Damsel Fish

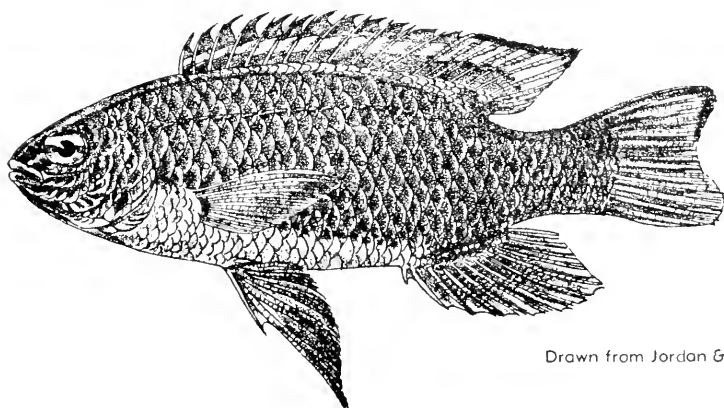
112-14 *Abudefduf leucopomus* (Cuvier)

Drawn from Jordan & Seale

This fish may be recognized by a blue line on its head running from the snout to the eye. In general the body is pale in color in front and purplish behind. The scales along the sides of the body are marked with purple spots. It reaches three inches in length.

This fish is distributed throughout southern Polynesia and is also found at Wake and throughout the Hawaiian Islands.

Damsel Fish

112-15 *Abudefduf uniocellatus* (Quoy & Gaimard)

Drawn from Jordan & Seale

This fish is found from the Island of Ceylon eastward through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Only one specimen is known from the Hawaiian Islands.

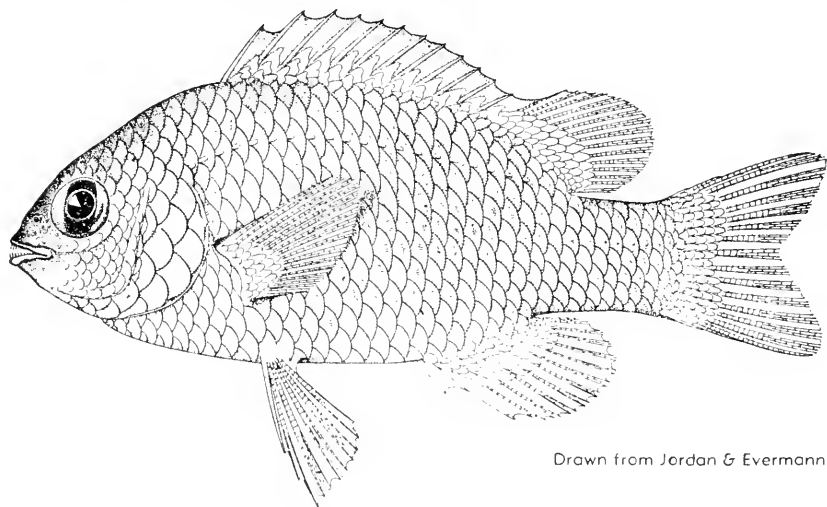
Damsel Fish

112-16 *Abudefduf leucozonus* (Bleeker)

This fish measures about three inches in length. It is found from the Red Sea through the East Indies, Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands.

Damsel Fish

112-17 *Abudefduf imparipennis* (Vaillant & Sauvage)



Drawn from Jordan & Evermann

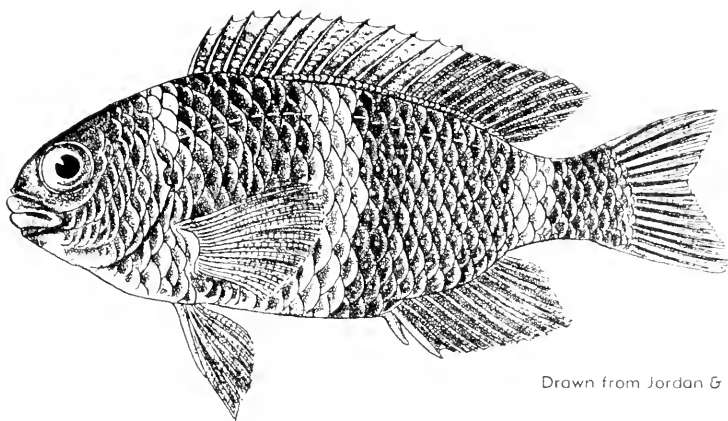
This damselfish is a rich olive color on the back and shades to a pale grayish on the sides and to a whitish color beneath. It reaches a length of about three inches. A most agile fish, it lives in the coral rock pools along the reefs.

This fish is found in the Hawaiian Islands and throughout Polynesia.

Damsel Fish

112-18 *Abudefduf amabilis* (De Vis)

The body of this fish is generally uniform in color. Two vertical lines cross the body, the first in the region of the dorsal fin and the second



Drawn from Jordan & Seale

at the base of the tail. It will reach a length of at least four inches.

This fish is found from Japan and the Philippine Islands through Micronesia and Polynesia as far as the Hawaiian Islands.

THE WRASSE FISH FAMILY

Including the Hogfishes and the Lady Fishes

113 *Family Labridae*

The family of the wrasse fishes is a very large group of fishes found chiefly in tropical seas, although a few do inhabit the waters of colder areas.

In general, the members of this family are nearly all brilliantly colored. Marked with blue, green, golden, scarlet, crimson and purple, they form a brilliant and interesting group of tropical reef fishes.

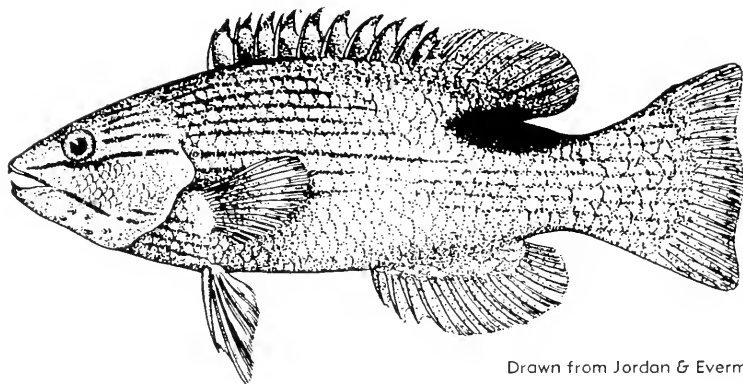
The members of the family of the wrasse fishes may be recognized by the presence of separate teeth in the front of the jaw. These teeth are very strong and are used for crushing the shells of the molluscs on which they feed. Nearly all of the members of the family live about rocks, reefs, and kelp beds, where they feed on molluscs and other forms of marine life.

The wrasse fishes are one of the very largest families of fishes. They include about 450 species and are well represented in Polynesia. This family is represented by about 45 species in Hawaiian waters and is the largest family of fishes in the Islands.

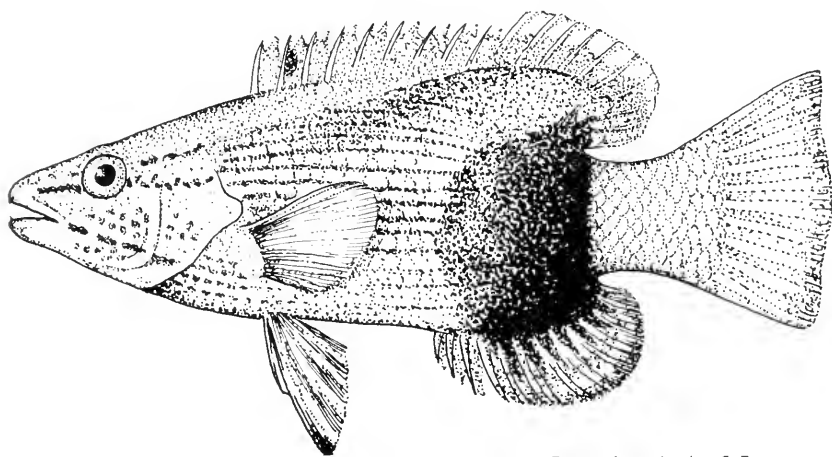
Aawa or Spot Wrasse

113-1 *Lepidaplois bilunulatus* (Lacepede)

Plate VII, Figure 10



Drawn from Jordan & Evermann



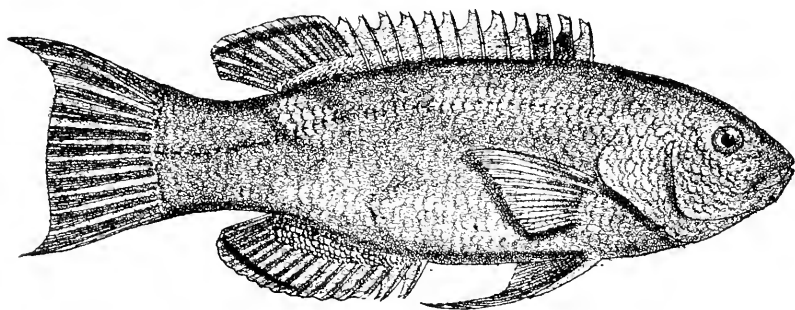
Drawn from Jordan & Evermann

The aawa is whitish in color and is marked with a pinkish tinge and a number of horizontal brown stripes. The body is marked by a very singular black spot situated on the base of the tail just behind the dorsal fin. The fins at the end of the body are yellow in color. This fish is occasionally darker than described. Mr. Fowler believes that this fish varies in color and therefore has grouped as a single species the two fish which appear in the drawings above. It reaches a length of about fourteen inches. It is a common species on the market.

This fish is distributed from Mauretius, through Ceylon, the East Indies, the Philippines, and Polynesia as far as the Hawaiian Islands.

Aawa

113-2 *Lepidaplois modestus* (Garrett)

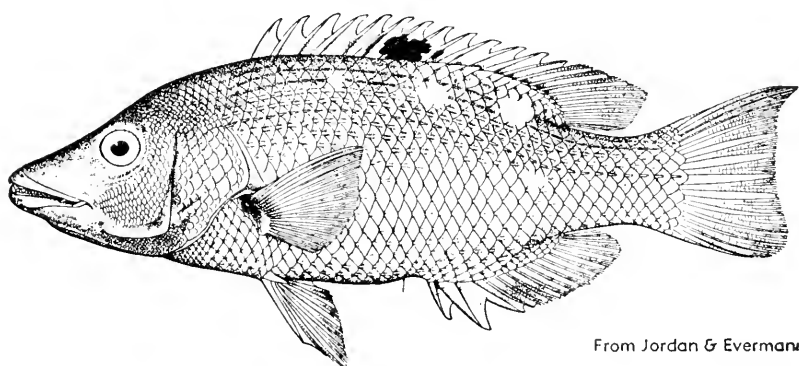


Drawn from Jordan & Evermann

This wrasse fish is known only from the Hawaiian Islands. It reaches a length of at least twenty inches. The body is purplish, bluish, brownish in color and is marked by a spot placed at the posterior end of the soft dorsal fin. The dorsal fin is marked with a single large spot while the soft dorsal and anal fins are tinged with red and margined with yellow.

Wrasse Fish

113-3 *Lepidaplois oxycephalus* (Bleeker)



From Jordan & Evermann

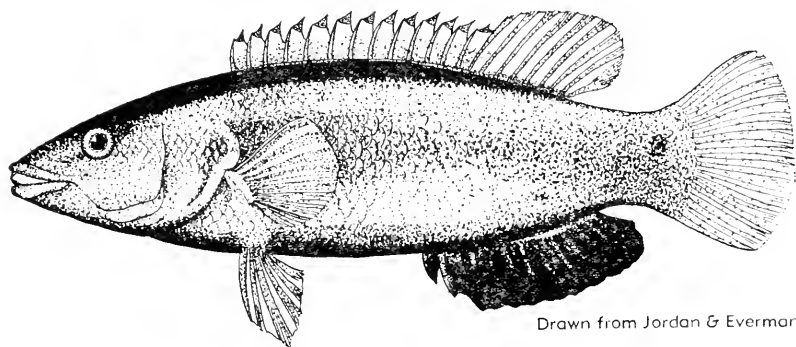
The body of this wrasse fish is uniform in color and is spotted in places. A black spot marks the middle of the dorsal fin. In addition, the

body is marked with faint, branching, longitudinal lines. It reaches a length of two feet.

This fish is distributed through the East Indies, along Queensland, through Japan, and occurs as far eastward as the Hawaiian Islands.

Wrasse Fish

113-4 *Verriculus sanguineus* Jordan & Evermann



Drawn from Jordan & Evermann

This wrasse fish is deep red in color. The edges of the mouth are trimmed with golden stripes which extend as a single golden stripe beneath the eye. A golden stripe extends from the eye to the tail. The tail fin is bright yellow in color. This fish reaches a length of about eight inches.

It is found only in the Hawaiian Islands.

Wrasse Fish

113-5 *Labroides dimidiatus* (Valenciennes)

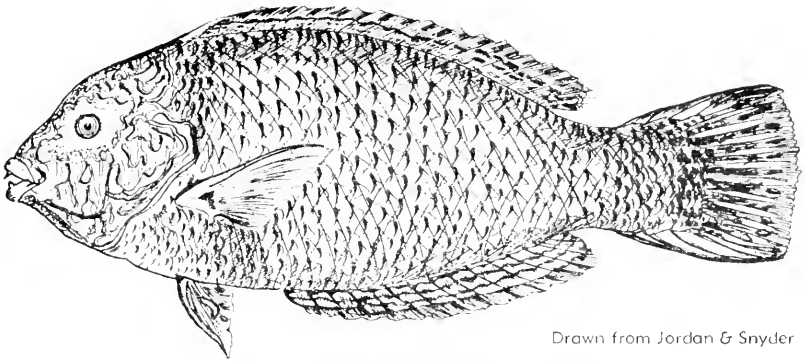
This fish is marked by a line running from the snout through the eye to the tail and there widening to include the entire caudal fin. Another stripe runs from the snout to the base of the dorsal fin. This species reaches a length of three inches.

This fish is distributed from the Red Sea and Mauretius through the Andaman Islands, the East Indies, the Philippines, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Opule

113-6 *Anampses godeffroyi* Gunther

The body of this wrasse fish is brownish red in color and is marked with about one dozen pale horizontal stripes and other small markings. It will reach a length of about twelve inches.



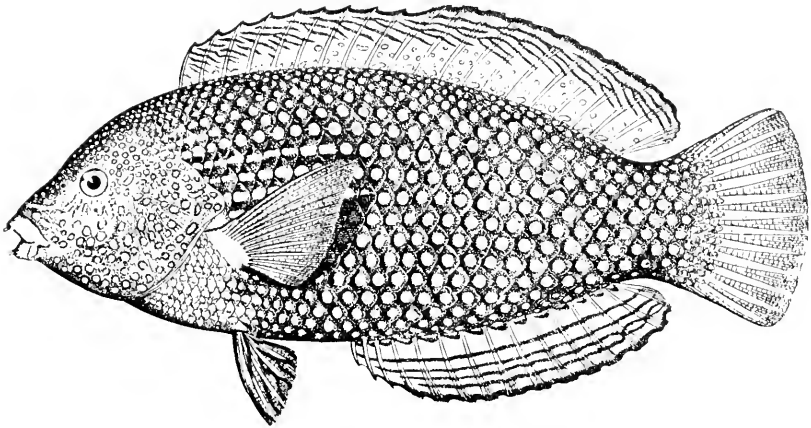
Drawn from Jordan & Snyder

This fish is distributed among the islands of Polynesia and occurs as far north as the Hawaiian Islands.

Opule

Also known as the Hilu or Spotted Wrasse

113-7 *Anampses cuvier* Quoy & Gaimard

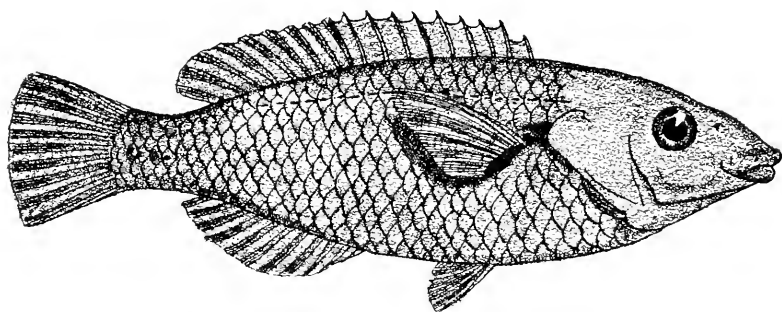


From Jordan & Evermann

The opule is one of the most brilliantly marked and beautiful of all the reef fishes found in Hawaiian waters. It is grayish olive in color above, becoming a brick red on the under parts of the body. The entire body is covered with small, round, white spots. It will reach a length of twelve inches.

This wrasse fish is known only from the Hawaiian Islands.

Omaka

113-8 *Stethojulis axillaris* (Quoy & Gaimard)

Drawn from Jordan & Evermann

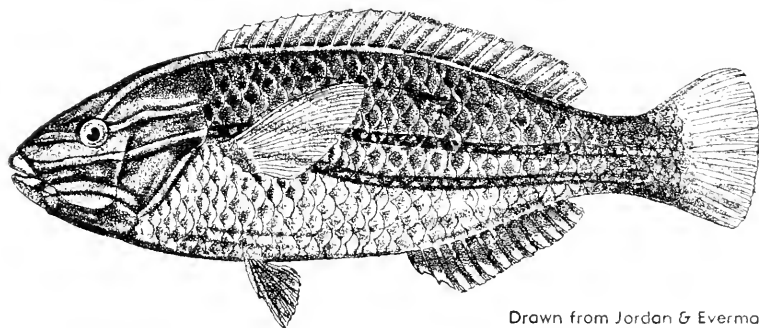
The omaka is an olive color in life and is marked with an irregular white area over the body and two black spots at the base of the tail. It will reach a length of at least five inches.

This fish is distributed from the Red Sea, East Africa, Reunion, and Madagascar through the East Indies, along Queensland, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Ohua

113-9 *Stethojulis albovittata* (Bonnaterre)

Plate VII, Figure 3

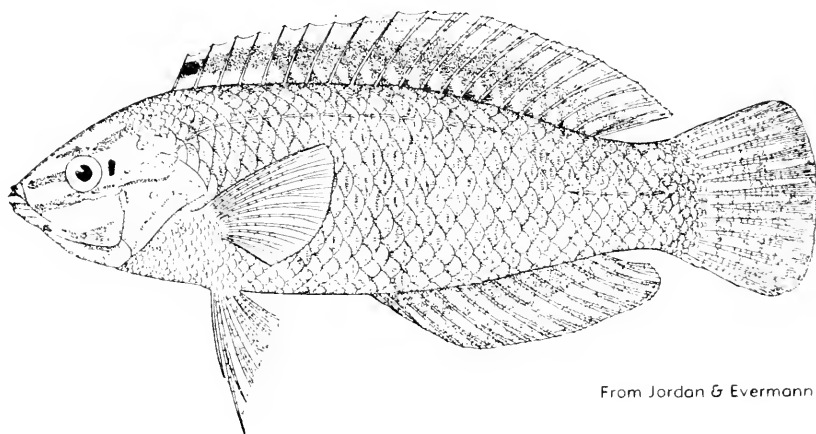


Drawn from Jordan & Evermann

The ohua is a grayish olive color above and grayish beneath. The body is marked with two bluish lines with a red stripe between them. This fish will reach a length of at least five inches.

The ohua is distributed throughout the East Indies, Micronesia, and Polynesia as far northward as the Hawaiian Islands.

Lao or Ohua Paawela

113-10 *Halicboeres ornatissimus* (Garrett)

From Jordan & Evermann

The lao is brick red in color above and a pale blue color beneath. The side of the body is marked with six faint series of greenish spots. There may be two spots on the dorsal fin and one behind the eye. The color pattern and markings on this fish seem to vary. It will reach a length of at least five inches. A brilliantly colored fish, it is not at all common about Hawaiian reefs.

This fish is known only from the Hawaiian Islands.

Wrasse Fish

113-11 *Pseudojulis cerasina* Snyder

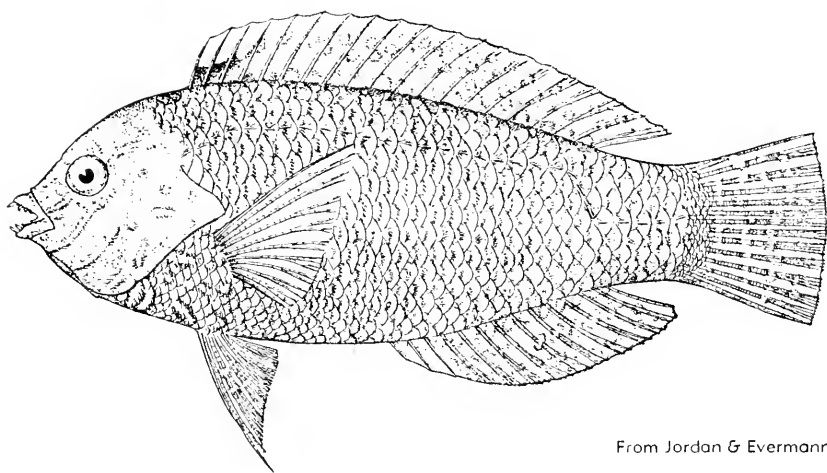
This rare fish is reported to have been orange on the head with nape and cheeks purplish, reddish orange on the back and fading to light orange color beneath. It is marked with a small reddish orange spot at the base of the pectoral fin. Each row of scales also bears a narrow line along its center. The only known specimen measured about four inches in length.

This fish is known only from Honolulu.

Hinalea Akilolo

113-12 *Macroparyngodon goeffroy* (Quoy & Gaimard)

The body of this fish is olive color in life and is marked with spots on the scales which form stripes along the body. The head is marked



From Jordan & Evermann

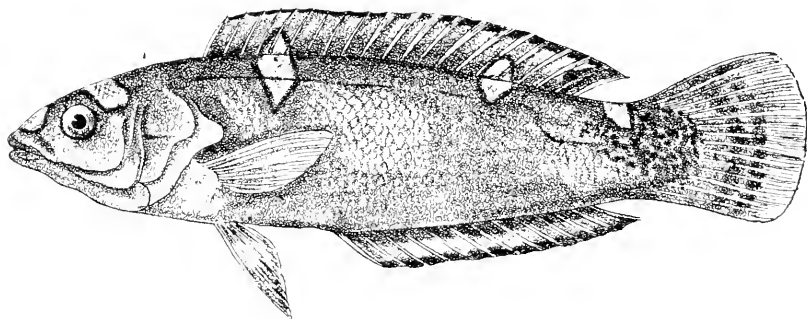
with several curved blue stripes. It will reach a length of at least six inches. A beautiful fish in life it is comparatively rare about the reefs.

This fish is distributed through the East Indies, Melanesia, Micronesia, and Polynesia as far north as the Hawaiian Islands.

Wrasse Fish

113-13 *Coris greenovii* (Bennett)

Plate VII, Figure 1



Drawn from Jordan & Evermann

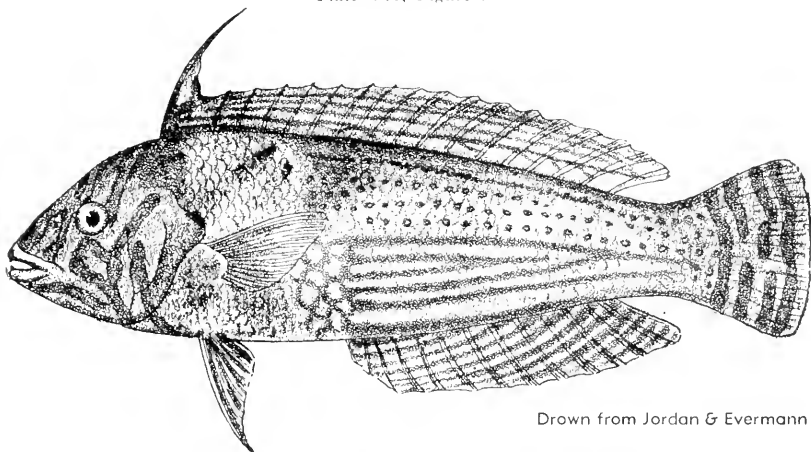
The body of this fish is a blood red color in life and is marked with five whitish spots on the upper part of the body, each with a black border. Two of these spots are located on the head, two are on the body, and one is at the base of the tail. This fish will reach a length of five inches.

This fish is distributed through Micronesia and Polynesia as far northward as the Hawaiian Islands.

Malamalama or Hilu Mele Mele

113-14 *Coris ballieni* Vaillant & Sauvage

Plate VII, Figure 7



Drawn from Jordan & Evermann

The color of this fish varies considerably. It ranges from white or olive to a pinkish brown color and is usually marked with yellow, bluish or greenish spots or lines on the body. The first dorsal spine is usually elongated. It will reach a length of twelve inches. It is fairly common about Hawaiian reefs.

This fish is known only from the Hawaiian Islands.

Wrasse Fish

113-15 *Coris variegata* (Ruppell)

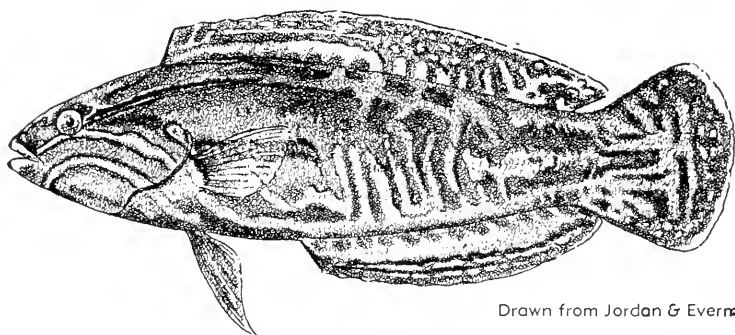
This fish is marked by a blackish crescent on the opercle and by six broad double vertical bands across the body. The dorsal fin contains one spot each at the bases of the last two dorsal rays. It reaches a length of at least four inches.

This fish is distributed from the Red Sea through the East Indies and New Guinea to the Hawaiian Islands.

Wrasse Fish

113-16 *Coris venusta* Vaillant & Sauvage

This wrasse fish is a brownish color in life, darker above than below, and is marked with a red band along the lateral line and many



Drawn from Jordan & Evermann

blue-green markings too numerous to designate. It will reach a length of at least six inches. This wrasse fish is fairly common about the coral reefs. It was well known in olden times and was reputed to have a medicinal value.

This fish is known only from the Hawaiian Islands.

Wrasse Fish

113-17 *Coris multicolor* (Ruppell)

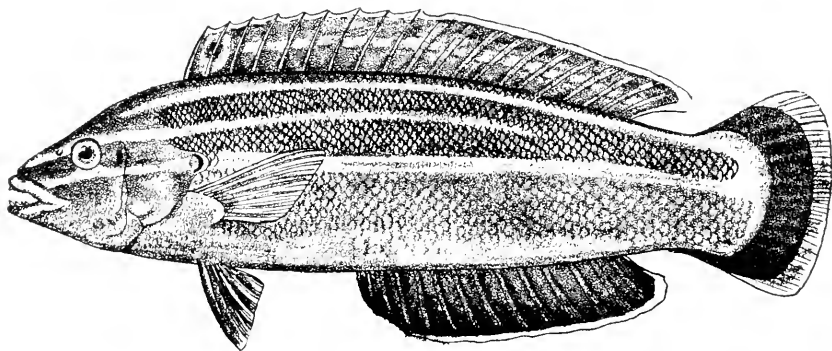
This fish very closely resembles *Coris venusta* but differs in having two or three blue longitudinal bands on the ends of the dorsal and anal fins. It is further marked by six saddles on the back. It reaches a length of at least six inches.

This fish is distributed from the Red Sea and Natal through Melanesia and across the Pacific Ocean to the Hawaiian Islands.

Hilu

113-18 *Coris flavovittata* (Bennett)

Plate VII, Figure 11



Drawn from Jordan & Evermann

The body of the hilu is brownish in color above and is marked with three longitudinal stripes. The lower surface of the fish varies from a pure white color to a rosy pink. The dorsal fin is marked with a series of eighteen yellowish spots. The tail is brownish in color and is marked with a white border. A large and brilliantly marked species it reaches a length of sixteen inches or more. It is commonly seen in the markets.

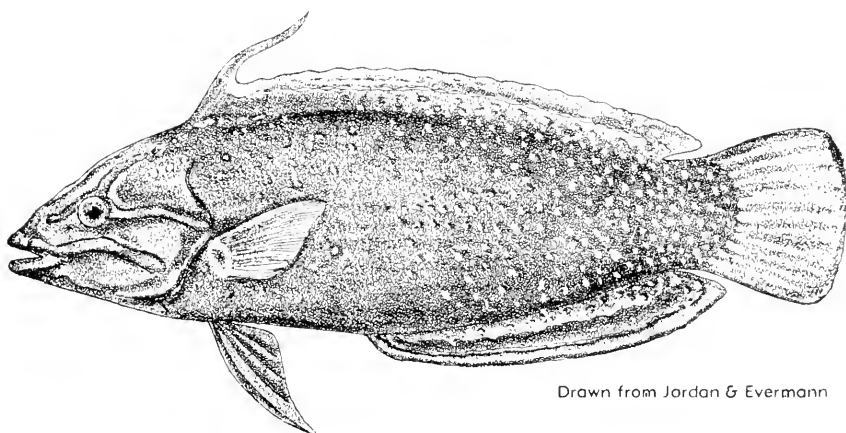
This fish is known from the Hawaiian Islands and from Guam.

Hinalea Akilolo

Also known as Hinalea Lolo, Lolo, or Lazy Fish

113-19 *Coris gaimard* (Quoy & Gaimard)

Plate VII, Figure 4



Drawn from Jordan & Evermann

The body of this fish is reddish or brownish and is marked with green bands on the head and chin. The posterior half of the body is covered with small, blue-edged violet spots. The tail is golden in color. The color seems to vary somewhat. This species will reach a length of twelve inches.

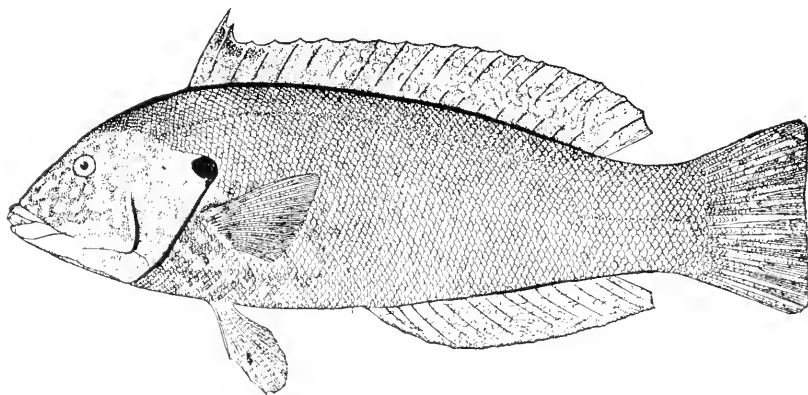
This wrasse fish is fairly common about the Hawaiian Islands and is commonly seen on the markets. It was called lolo or lazy because it, along with many other members of its family, buries itself in the sand when at rest with only the snout protruding.

This fish is distributed from Zanzibar and Ceylon through the East Indies, Riu Kiu, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Hilu Lauwili

Also known as Hilu Eleele and Uhu

113-20 *Coris lepomis* Jenkins



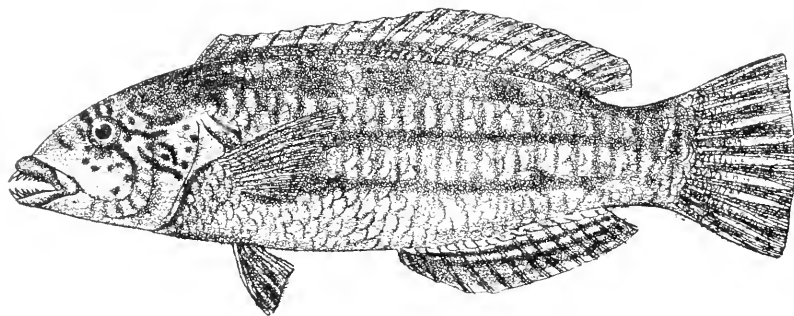
From Jordan & Evermann

This wrasse fish is a greenish color in life. It is adorned with blue shades and yellowish markings and has a single black spot on the opercle. This fish will reach a length of nineteen inches and is one of the largest and most beautiful of the wrasse fishes. It is commonly sold upon the markets.

This wrasse fish is known only from the Hawaiian Islands.

Wrasse Fish

113-21 *Thalassoma umbrostigma* (Ruppell)



Drawn from Jordan & Evermann

The body of this fish is pale greenish in color and is marked with three irregular, reddish, longitudinal stripes. It reaches a length of at

least eleven inches.

This fish is distributed from the Red Sea, Natal, Mauretius, Bourbon, Seychelles, through India, the East Indies, the Philippines, China, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Wrasse Fish

113-22 *Thalassoma quinquevittatus* (Lay & Bennett)

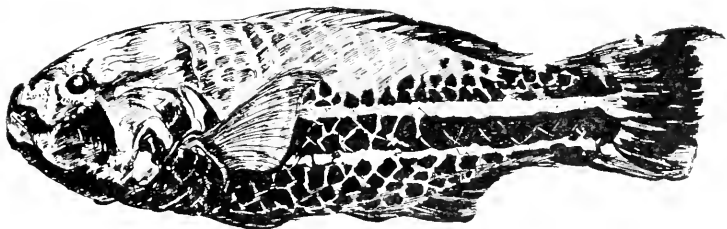
This wrasse fish is greenish in color in life. It has a varied mottled pattern of stripes and spots over the body and is marked by reddish stripes along the sides of the trunk. A very beautiful fish, it reaches a length of at least four inches.

This fish is distributed from the Cape of Good Hope through the East Indies, the Philippines, Riu Kiu, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Awela

Also known as the Olale, Hou, and Opule

113-23 *Thalassoma purpurem* (Forsk.)



This fish is a bright grass-green color above and blue beneath. It is marked with reddish and purplish colors on the head and by two longitudinal red stripes on the side of the body. The color of the body changes with death. It will reach a length of at least sixteen inches.

This fish is distributed from the Red Sea, to Ceylon, Melanesia, and Polynesia as far as Easter Island and the Hawaiian Islands.

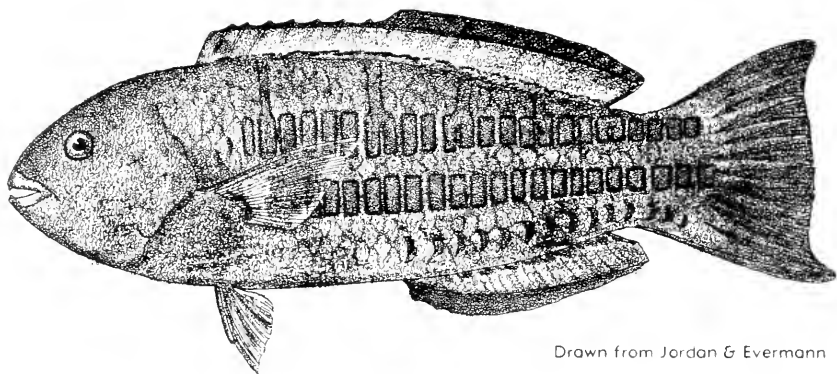
The accompanying drawing is from a preserved specimen.

Awela

113-24 *Thalassoma trilobata* (Lacepede)

Plate VII, Figure 8

The body of this fish is coral reddish in color above and yellowish beneath. The body is marked by two longitudinal rows of bluish-green



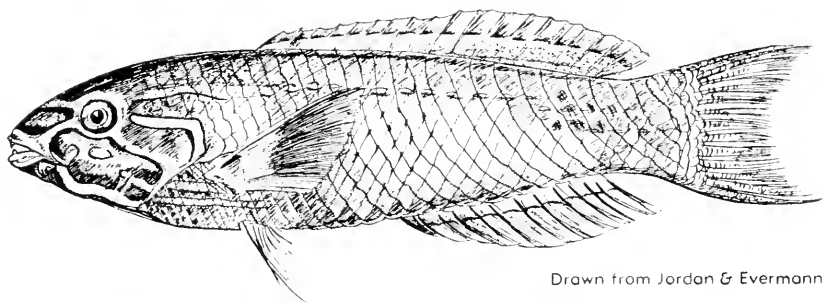
Drawn from Jordan & Evermann

rectangular spots along the side of the body. It will reach a length of about twelve inches.

This fish is distributed from Zanzibar, Madagascar, Seychelles, Bourbon, and Mauretius through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Island.

Aalaihi or Alaihi

113-25 *Thalassoma lutescens* (Lay & Bennett)



Drawn from Jordan & Evermann

This fish is a greenish color in life and is crossed by numerous narrow vertical brown orange bands. The sides of the head and the snout are marked with four broad bright green bands which are separated by golden spaces. It will reach a length of at least six inches.

This fish is distributed from Japan and Riu Kiu along northeastern Australia, and throughout Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Wrasse Fish

113-26 *Thalassoma melanochir* (Bleeker)

This species is marked by a stripe from the snout along the side of the head to the corner of the opercle, by a blotch at the base of the pectoral fin and by a vertical line on each scale. It reaches a length of at least six inches.

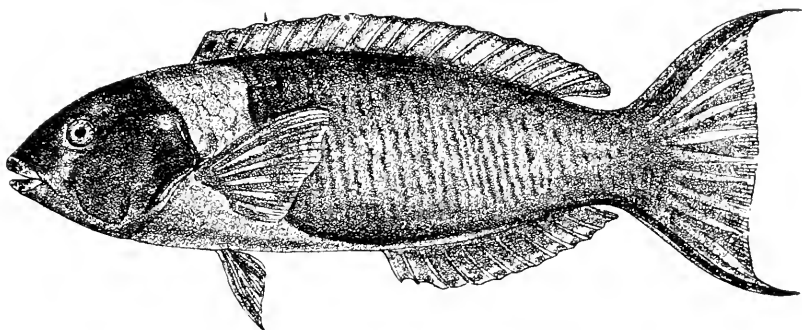
This fish is distributed from the East Indies, through Micronesia and Polynesia as far as the Hawaiian Islands.

Hinalea Lauwili

Also known as Aalaihi, Hinalaea Luahine, and Saddle Wrasse

113-27 *Thalassoma duperrey* (Quoy & Gaimard)

Plate VII, Figure 6



Drawn from Jordan & Evermann

The body of this fish is greenish in color and is marked with many small, narrow, vertical, purplish red bars. A broad band of reddish orange crosses the body behind the pectoral fin. It will reach a length of ten inches.

This particular fish is one of the most abundant of all of the wrasse fishes found in the Hawaiian Islands.

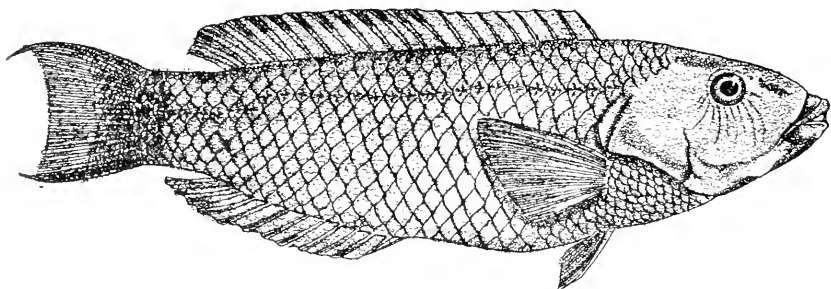
This fish is found only in Hawaii and its leeward islands.

Hinalea Luahine

113-28 *Thalassoma ballieu* (Vaillant & Sauvage)

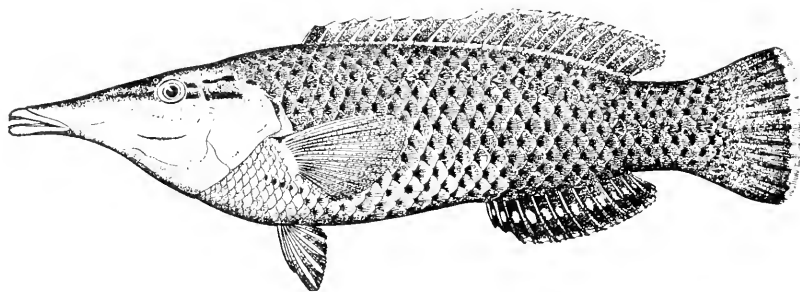
This fish is marked by short vertical bars over the entire body. It reaches a length of at least fifteen inches.

This species is sometimes seen in the markets. This fish is distributed throughout Hawaii, its Leeward Islands and Johnston Island.



Drawn from Jordan & Evermann

Akilolo or Hinalea Akilolo
113-29 *Gomphosus varius* Lacepede



From Jordan & Evermann

This fish is easily recognized by its long snout and jaws. It reaches a length of about ten inches.

This fish is distributed from the Red Sea, East Africa, Natal, Madagascar, and Mauretius, through Ceylon, the Andamans, the East Indies, Japan and Riu Kiu, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Hinalea Iiwi or Bird Fish

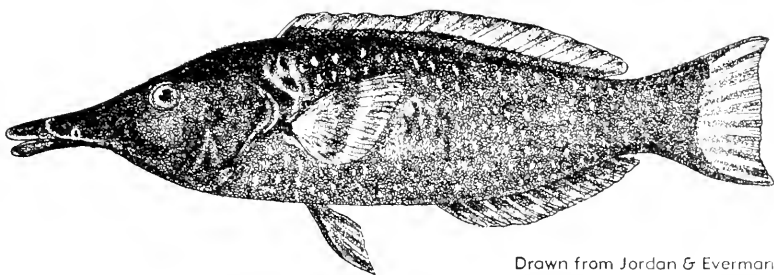
Also known as the Hinalea Nuku Iiwi and Nukuloa Elcele

113-30 *Gomphosus tricolor* Quoy & Gaimard

Plate VII, Figure 5

This fish is an indigo blue color in life and is marked with greenish shades on the back and belly. It reaches a length of about twelve inches.

This fish receives its name from the fact that its bill (nuku) resembles that of the iwi bird. This fish is sometimes seen in the markets.



Drawn from Jordan & Evermann

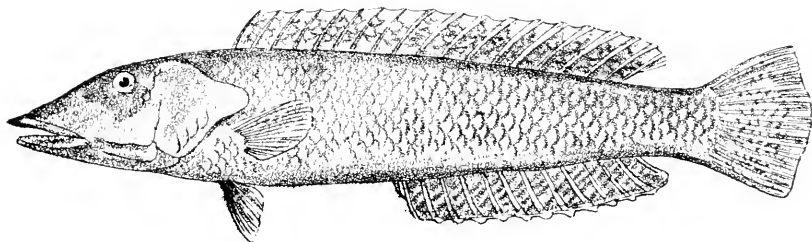
This species is distributed along China, through Japan, the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Kupoupou

Also known as Kupou, Kunounou, and Poupou

113-31 *Cheilio inermis* (Forsk.)

Plate VII, Figure 9



Drawn from Jordan & Evermann

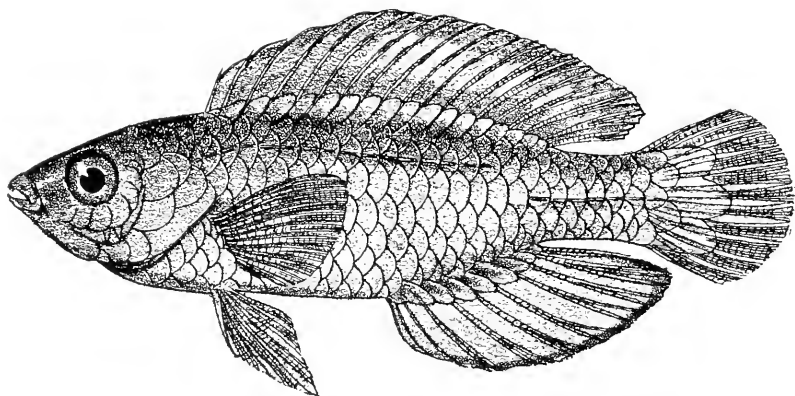
The kupoupou is olive green color in life above and bluish beneath. The head is greenish yellow in color and a yellow spot marks the side of the body above the pectoral fin. It is a long, slender fish and will reach a length of about sixteen inches. It is reported to live in quiet waters.

This fish is distributed from the Red Sea, Zanzibar, Mozambique, Natal, Madagascar, and Mauritius through the East Indies, the Philippines, Formosa, China, and Riu Kiu, along Queensland, and throughout Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Solor Island Wrasse Fish

113-32 *Cirrhitilabrus solorensis* Bleeker

This small wrasse fish is pale reddish in color and is marked with a few scattered white spots on the back. The anal fin is edged with black.



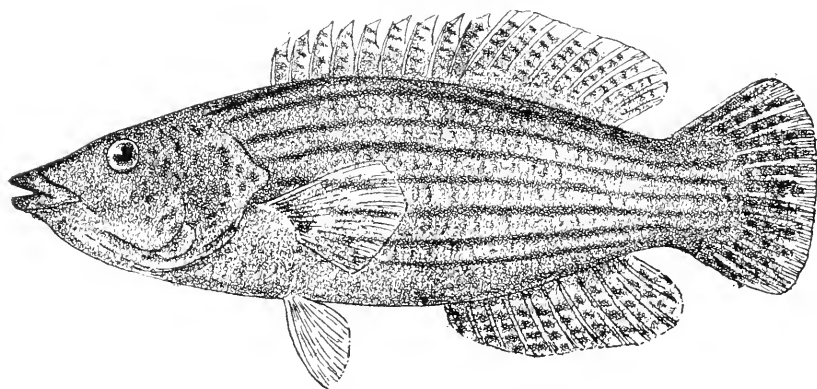
Drawn from Jordan & Evermann

It reaches a length of about four inches and is found between 28 to 43 fathoms in Hawaiian waters. This fish is known from Solor Island northwest of Timor, New Guinea, and the Hawaiian Islands.

Alaihi Laka

113-33 *Pseudocheilinus hexataenia* (Bleeker)

Plate VII, Figure 2

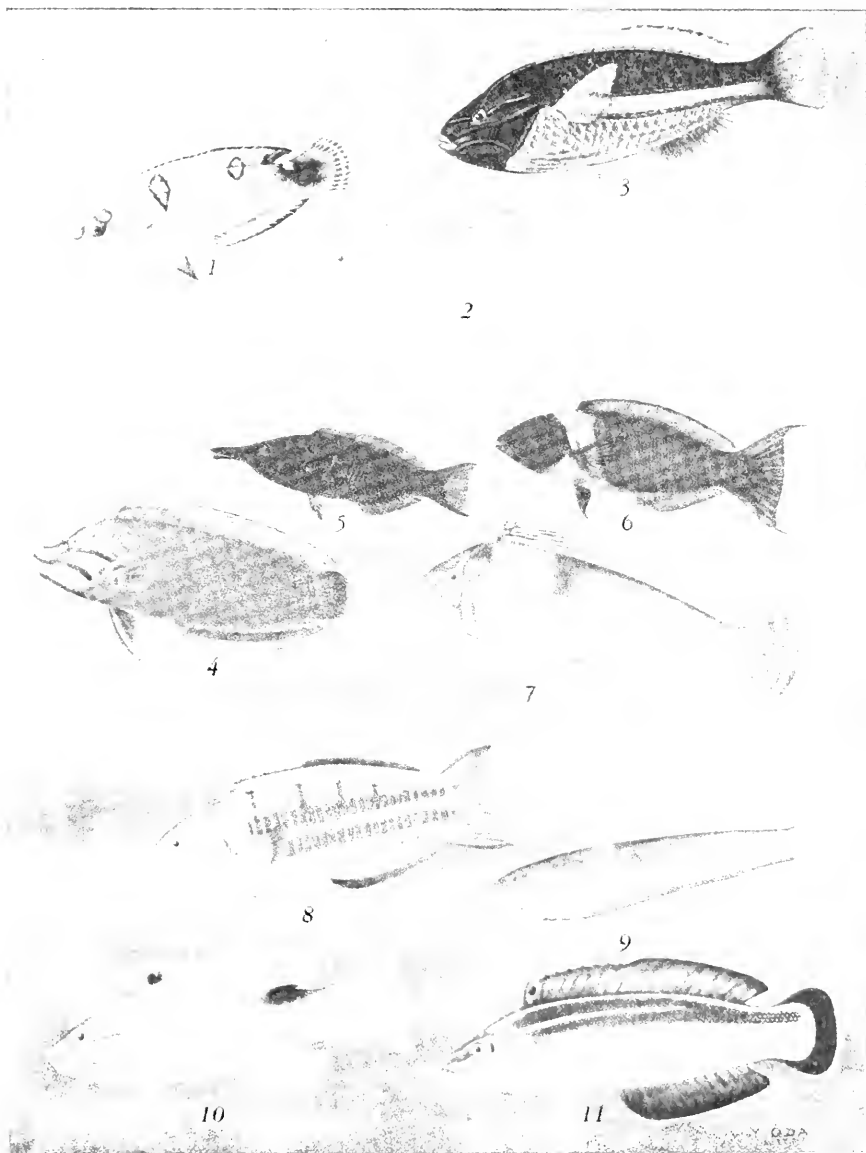


Drawn from Jordan & Evermann

Although the color varies greatly, this wrasse fish is usually reddish in color above and yellowish to purplish beneath. The sides of the body are marked with seven or eight dark longitudinal lines. It reaches a length of about six inches. It is found about tide pools in lava rock.

This fish is distributed from the Red Sea and Madagascar through the East Indies and Polynesia as far as the Hawaiian Islands.

Plate VII



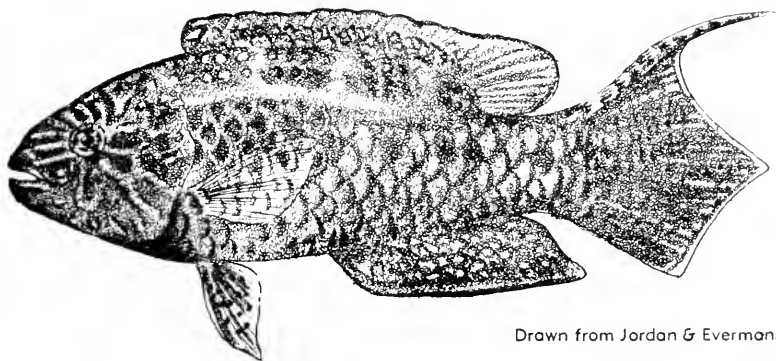
1. Wrasse Fish
2. Alaibi Laka
3. Obua
4. Hinalea Akilolo
5. Hinalea Iiwi
6. Hinalea Lauwili

7. Malamalama
8. Awela
9. Kuponpon
10. Aawa
11. Hilu

Poou or Pilikoa Liili

113-34 *Cheilinus bimaculatus* Valenciennes

Plate VIII, Figure 10



Drawn from Jordan & Evermann

The poou is a little rosy red fish, greenish on the back and covered with orange-red lines which are formed by the edges of the scales. The caudal fin is pointed at its end and the top ray of the caudal fin is extended to form a streamer. It reaches a length of about five inches. The poou is a common fish and inhabits the coral rocks and pools.

Walter Chute reports that the Hawaiians regarded this fish as one of the last created and that the creator on completing it threw down his tools and exclaimed "Pau!" or finished. The correct name for this fish seems, however, to be poou.

This fish is distributed from the East Indies to the Hawaiian Islands.

Wrasse Fish

113-35 *Cheilinus trilobatus* Lacepede

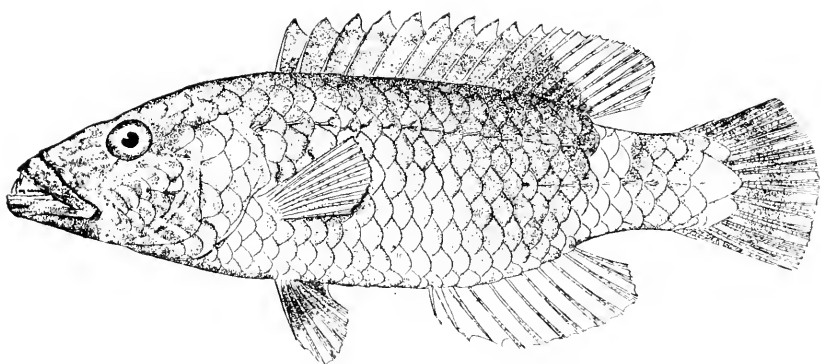
This wrasse fish is olive gray in color and is marked with greenish-blue and reddish stripes and streaks. It reaches a length of about six inches.

This fish is distributed from the Red Sea, Zanzibar, Madagascar, Bourbon, Reunion, Mauritius, and the Seychelles along India, through the East Indies, the Philippines, China, Japan, and Riu Kiu, and throughout Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Poou or Papai

113-36 *Cheilinus unifasciatus* Streets

The poou varies somewhat in color but is usually dull drab to reddish brown over its body. Each scale is marked with a vertical red bar to give this fish its characteristic pattern. It reaches a length of nearly one foot.



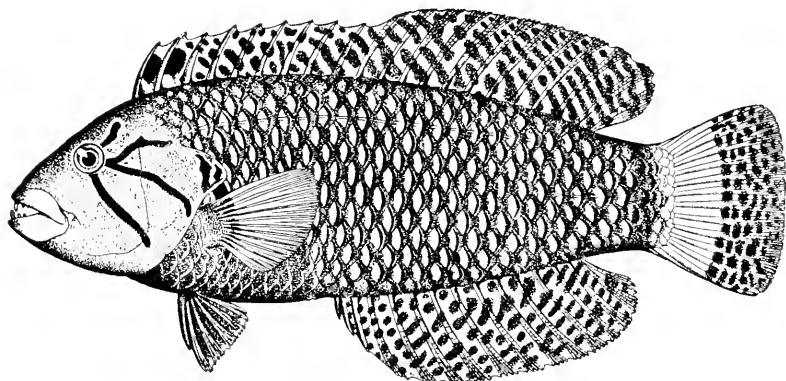
From Jordan & Evermann

This fish was taken in olden times by trolling from canoes in deep places. It is still sold in the markets.

This fish is distributed throughout the East Indies, and Polynesia as far as the Hawaiian Islands.

Wrasse Fish

113-37 *Novaculichthys taenionurus* (Lacepede)



From Jordan & Evermann

The body of this wrasse fish is dull olive brown in color in life. Each scale with the exception of those on the lower side is marked with a whitish spot giving the body a spotted appearance. Four dark bands radiate from the eye. It will reach a length of about ten inches.

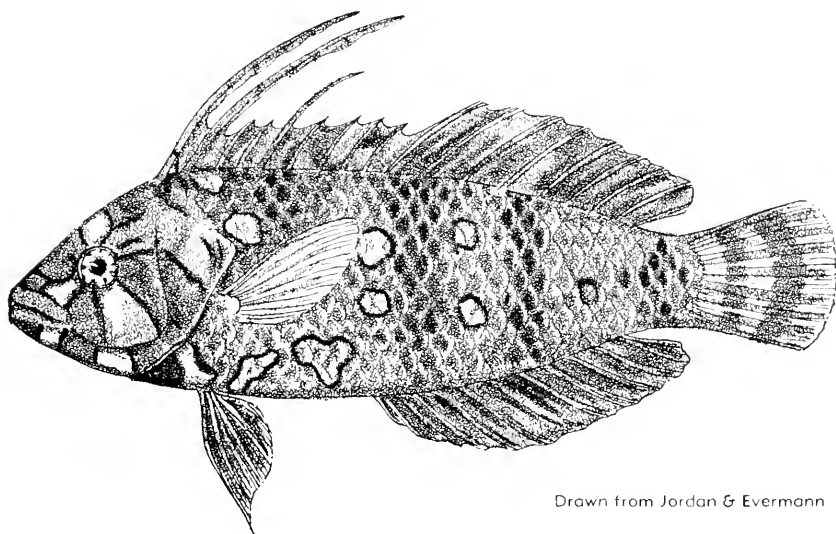
This fish is distributed from Zanzibar, Madagascar, Reunion, and

Mauretius, through the East Indies, the Philippines, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Wrasse Fish

113-38 *Novaculichthys bifer* (Lay & Bennett)

Plate VIII, Figure 9



Drawn from Jordan & Evermann

The body of this wrasse fish is grass green in color and is marked with white spots and blotches. It reaches a length of at least five inches. The first two spines on the dorsal fin are longer than the rest.

This fish is distributed from the Philippines, throughout the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

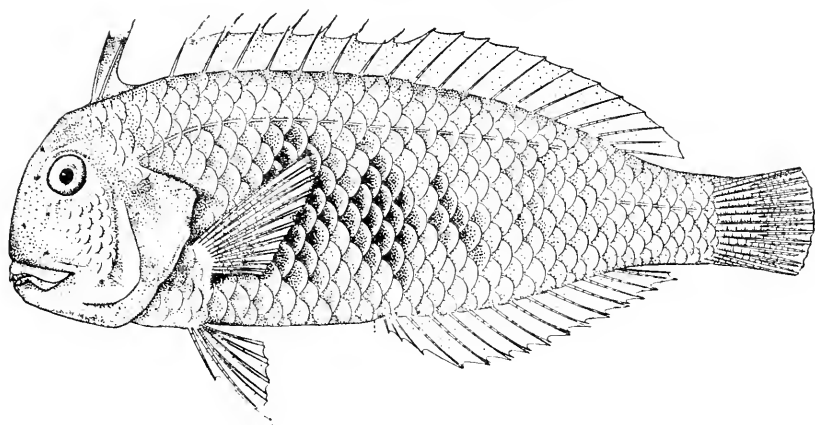
Wrasse Fish

113-39 *Cymolutes lecluse* (Quoy & Gaimard)

Although this wrasse fish varies in color, it is usually whitish and is marked by a small white spot on the side of the body. The body has rosy, yellowish, and greenish markings and reaches a length of about seven inches.

This fish is distributed from Mauretius through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Wrasse Fish

113-40 *Hemipteronotus pentadactylus* (Linne)

From Jordan & Evermann

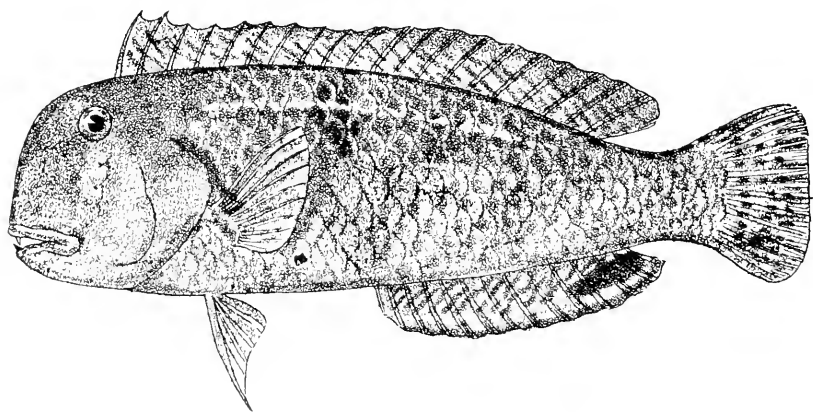
The color of the body varies from a light drab color to almost black. A large brown blotch marks the middle of the body. It reaches a length of about ten inches.

This fish is distributed from the Red Sea and Mauretius through India, the East Indies, the Philippines, Formosa, China and the Hawaiian Islands.

Laenihi or Razor Fish

113-41 *Hemipteronotus melanopus* (Bleeker)

Plate VIII, Figure 3



Drawn from Jordan & Evermann

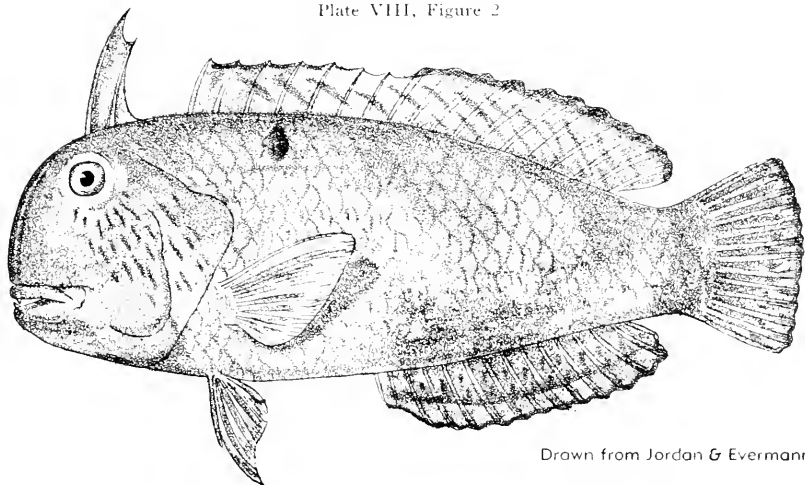
The color of this fish varies. It is yellowish or greenish over the head and back and yellowish to whitish beneath. The side of the body is marked with a dark blotch just above the middle. The males are marked with a dark brownish spot on the anal fin while the females have spots along the body behind the lateral blotch. It reaches a length of about ten inches.

This fish is distributed throughout the East Indies and the Hawaiian Islands.

Laenihi or Long Fin Razor Fish

113-42 *Iniistius pavo* (Valenciennes)

Plate VIII, Figure 2



Drawn from Jordan & Evermann

Although the color of this fish varies, it is usually an olive green color above and lighter below. The body is crossed by three or four darker vertical bands. A dark spot marks the upper side of the body above the pectoral fin. It reaches a length of about fifteen inches.

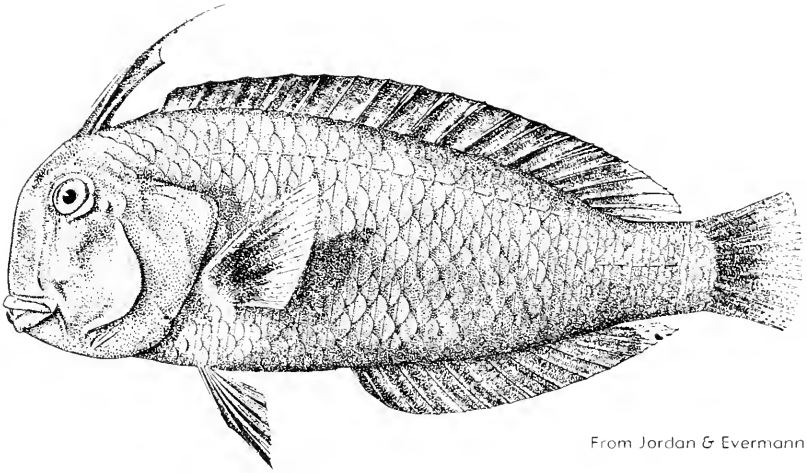
This gaily colored fish is one of the larger members of its family. It is valued as food and is often sold upon the markets.

This fish is distributed from Zanzibar, Mauretius, and Bourbon, through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Laenihi Eleele or Black Razor Fish

113-43 *Iniistius niger* (Steindachner)

This fish resembles its relatives in bodily structure but differs from them in color. Where they are blue and green, this fish is nearly uniform



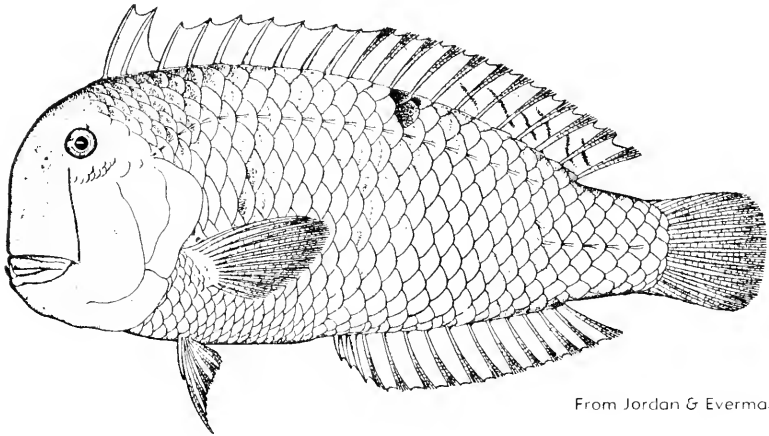
From Jordan & Evermann

black over its head and body. The lower surface of the body is purplish in color. This fish reaches a length of about eight inches.

Curiously enough this fish is known only from the Hawaiian Islands.

Laenihi

113-44 *Iniistius aneitensis* (Gunther)



From Jordan & Evermann

This razor fish is grayish in color in life and reaches a length of about ten inches. Each scale is marked with a violet spot and a golden border. A golden area marks the front of the body just above the pectoral fin. This is followed in turn by a whitish area and so on until the body has

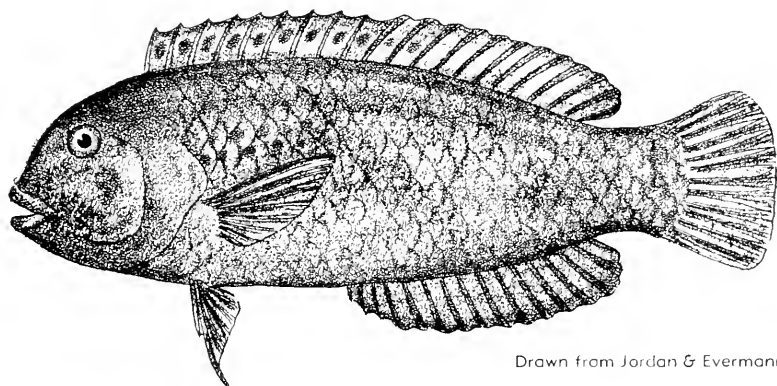
the appearance of being crossed by indistinct vertical bars. A black spot marks the upper side of the body at the middle. It is a beautiful fish and is quite common about the Hawaiian Islands.

This fish is distributed from Zanzibar through Melanesia to the Hawaiian Islands.

Wrasse Fish

113-45 *Xyrichtys virens* Valenciennes

Plate VIII, Figure 1



Drawn from Jordan & Evermann

Although this fish varies in color, it is usually an olive color above and a pale violet color beneath. The dorsal fin is marked by a series of dark blue spots. It reaches a length of about seven inches. It is fairly common about Hawaiian coral reefs.

This fish is distributed throughout Polynesia and the Hawaiian Islands.

THE PARROT FISH FAMILY

114 Family *Callyodontidae* (*Scaridae*)

The family of the parrot fishes includes species which are both dull and brilliant in color. Some of the species are dull reddish or greenish in color, while others are of a bright blue color or are marked with bright trimmings of various colors. The males and females are usually alike in color. All of the members of the family have large scales and the jaws are usually developed into a bony beak. In general, they are medium sized fishes.

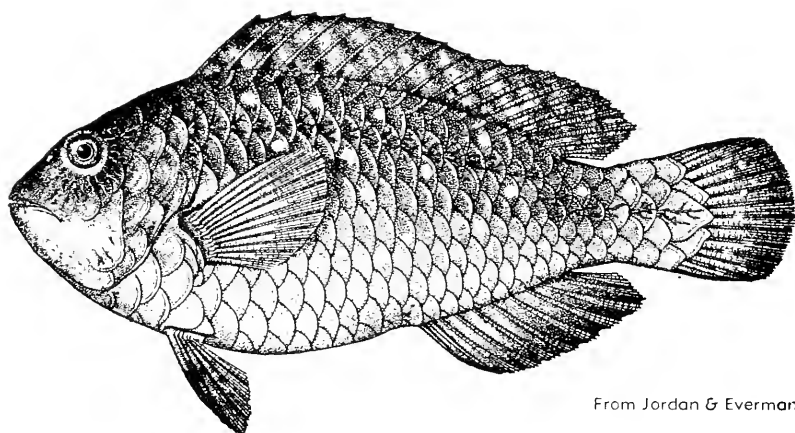
Nearly all of the members of the family are herbivorous. The smaller species seem to live about the algae while the larger species are more abundant about the coral reefs.

The flesh of these fishes is soft and pasty and is not much valued as food in America. In the Hawaiian Islands the flesh of this fish was highly prized and was often eaten raw. In olden times it was tabu to all except the royalty.

The parrot fishes are a large family containing over 100 species which are distributed through seven genera. Of this number about twenty species are known from the Hawaiian Islands.

Parrot Fish

114-1 *Scaridea balia* Jenkins



From Jordan & Evermann

The head and body of this parrot fish are covered with small, white spots and the first dorsal fin is composed of strong spines. It reaches a length of about ten inches. It is an uncommon fish and is rare in the markets.

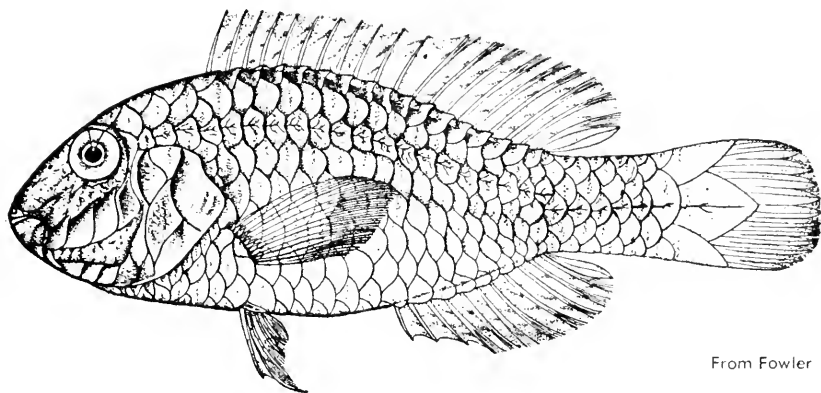
This fish is known only from the Hawaiian Islands.

Parrot Fish

114-2 *Scaridea octodon* Fowler

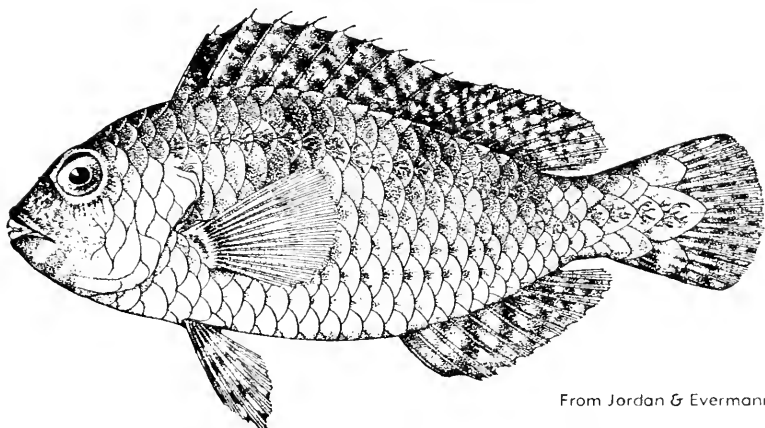
This fish was described as brown in color in alcohol and measuring about four inches in length. This fish was named for its eight externally flaring canine teeth.

It is a rare fish and is known from a single specimen taken in the Hawaiian Islands.



From Fowler

Parrot Fish

114-3 *Scaridae zonarcha* Jenkins

From Jordan & Evermann

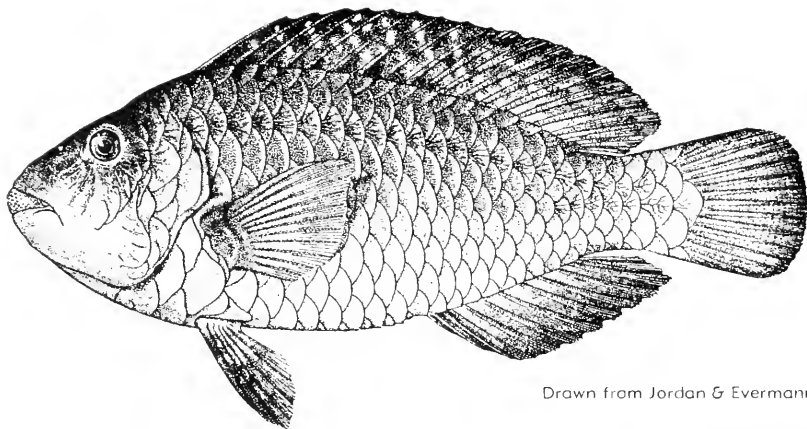
Although the color of this fish varies, it is usually grayish over the body and is marked with white, black, and yellow scales. The head and the fins are spotted and mottled; three orange-brown bands alternating with white mark the chin. This fish reaches a length of at least ten inches.

A fairly rare fish, it is known only from the Hawaiian Islands.

Uhu or Panuhunuhu

114-4 *Leptoscarus viridescens* (Ruppell)

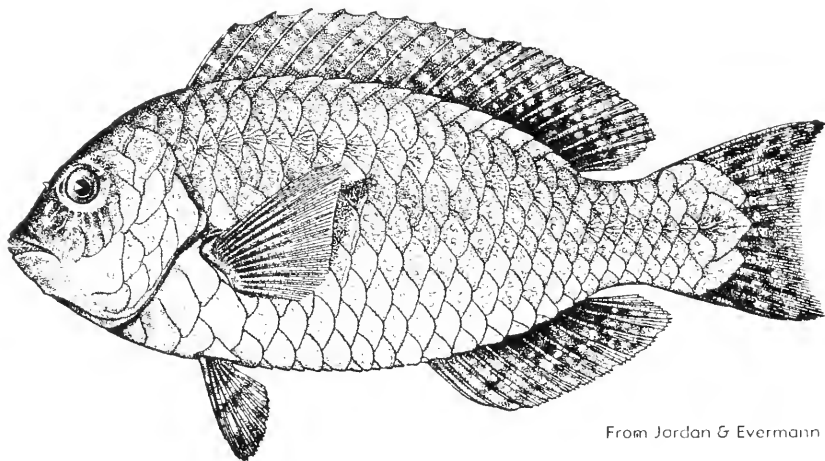
This parrot fish varies from a grayish to a reddish brown color in life. It reaches a length of about fifteen inches. It is valued as food and is a common fish in markets.



Drawn from Jordan & Evermann

This species is distributed from the Red Sea, Zanzibar, and East Africa through the East Indies and Polynesia as far as the Hawaiian Islands.

Caroline Island Parrot Fish
114-5 *Leptoscarus carolinus* (Valenciennes)



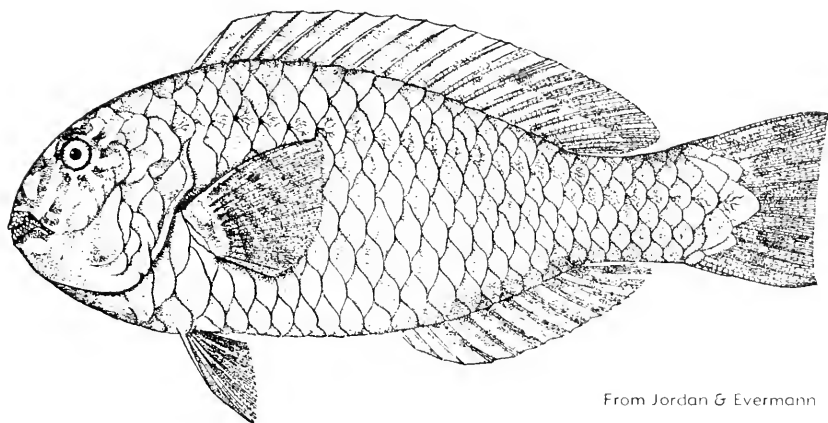
From Jordan & Evermann

This fish is marked on the side of the body by white spots, five of which lie above the lateral line and ten or twelve beneath. It measures about ten inches in length.

This fish is distributed from the East Indies through Micronesia and Polynesia as far as the Hawaiian Islands.

Uhu or Panuhunuhu

114-6 *Leptoscarus vaigiensis* (Quoy & Gaimard)



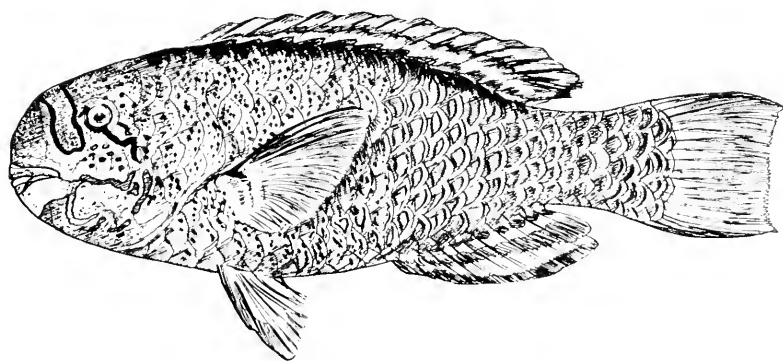
From Jordan & Evermann

The body and fins of this fish are blue in color. The eye is encircled by a pink band. It reaches a length of twenty inches.

This fish is distributed from New Guinea through Melanesia and Polynesia as far as the Hawaiian Islands.

Uhu or Uhu Uliuli

114-7 *Catlyodon perspicillatus* (Steindachner)



This fish was described as a vitrol green color in life with a lavender drab belly and a blue stripe and ring about the eye. It reaches a length of over two feet.

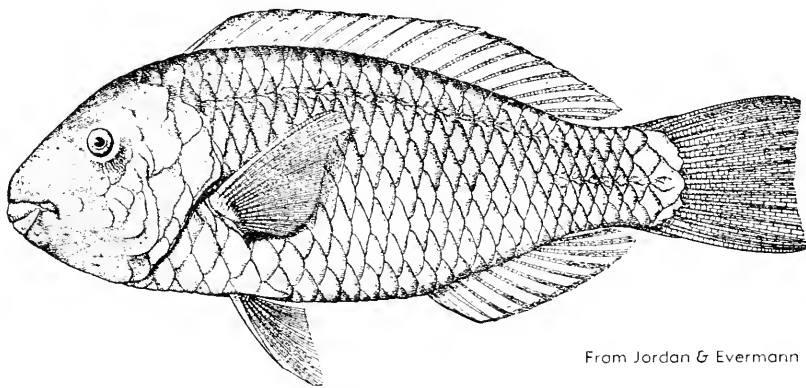
This fish is one of the largest and prettiest of the parrot fishes in the Hawaiian Islands. It is fairly common and is valued as food.

This fish is only found at Johnston Island and in the Hawaiian Islands and its leeward chain.

Uhu

Also known as the Ahuula or Panuhunuhu

114-8 *Callyodon abula* (Jenkins)



This fish is a dull red in color and is darker above than beneath. One of the largest of the family in the Hawaiian Islands, it reaches a length of about twenty inches. It is an important fish in the Islands and brings a good price on local markets.

This fish is known to occur from Johnston Island through Hawaii and its leeward islands.

Red Parrot Fish

114-9 *Callyodon erythrodon* (Valenciennes)

This fish is rose colored and reaches a length of about ten inches. It is reported to be fairly common in the markets.

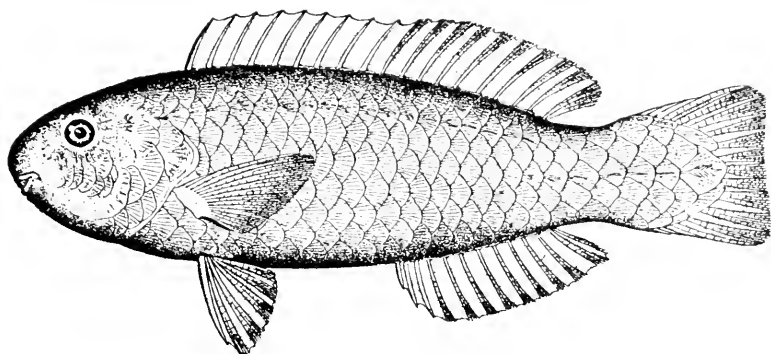
This parrot fish is distributed from Zanzibar, Mauretius, and East Africa through India, Ceylon, the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Panuhunuhu

114-10 *Callyodon borbors* (Jordan & Evermann)

This fish very closely resembles *Callyodon erythrodon* and may possibly be the same species. It is reported to reach a length of at least eight inches.

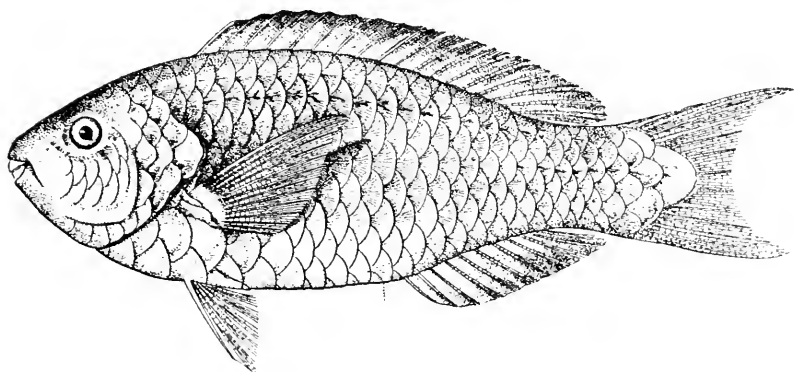
This species is known from Wake and the Hawaiian Islands.



From Jordan & Evermann

Parrot Fish

114-11 *Callyodon brunneus* (Jenkins)



From Jordan & Evermann

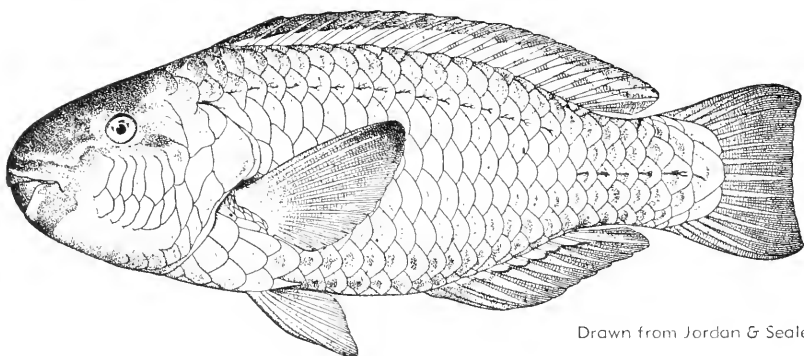
This parrot fish is a gray color in life and is marked with gray, brown, and reddish areas over its body. It reaches a length of twelve inches and is not an uncommon fish on local markets.

This fish is distributed throughout Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Parrot Fish

114-12 *Callyodon sordidus* (Forsk.)

This parrot fish varies in color and markings. It is darker above than below and is marked with greenish, bluish, and yellowish lines and spots.



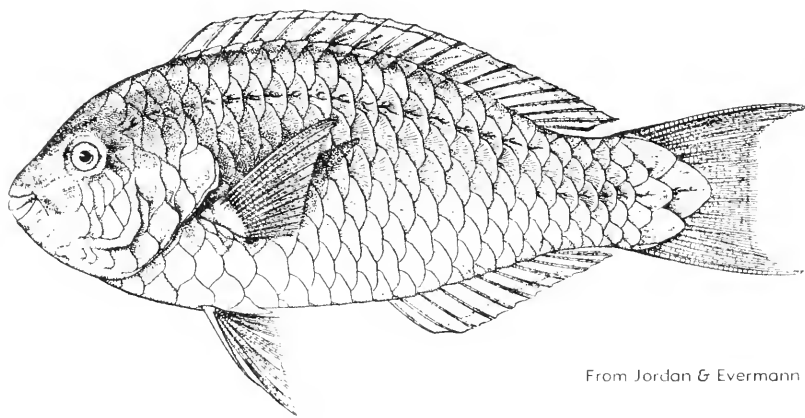
Drawn from Jordan & Seale

The dorsal and anal fins have longitudinal stripes along their margins. This species reaches a length of at least sixteen inches.

This fish is distributed from the Red Sea, East Africa, and Mauretius through India, the East Indies, to China and then through Melanesia, Micronesia, and Polynesia to the Hawaiian Islands.

Panuhunuhu, Uhuhalahala, or Halahala

114-13 *Callyodon forsteri* (Valenciennes)



From Jordan & Evermann

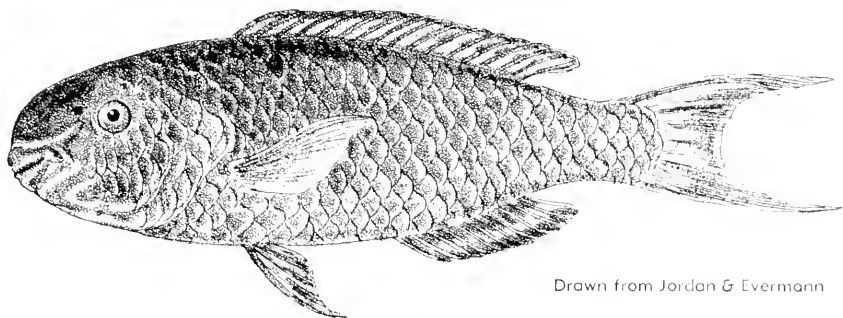
This parrot fish is a blue-green color in life and is marked with reddish borders on its scales. It reaches a length of about fourteen inches and is a fairly abundant species.

This fish is distributed throughout the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Blue Parrot Fish

114-14 *Callyodon jordani* (Jenkins)

Plate VI, Figure 3



Drawn from Jordan & Evermann

This parrot fish varies in color from a blue to a dark greenish brown, although it is usually blue in color.

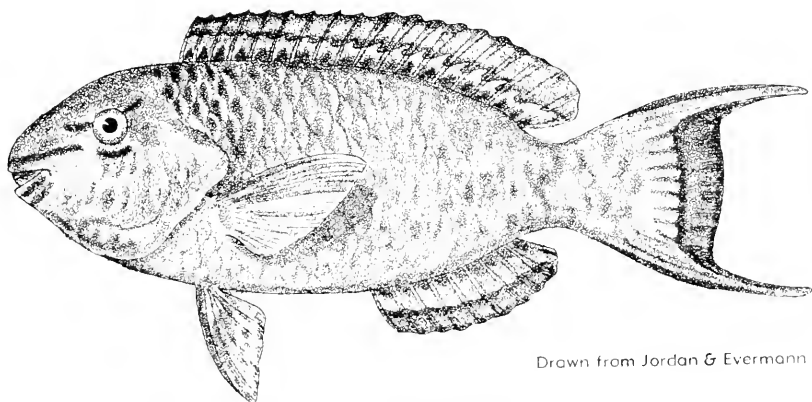
This fish is uncommon about Hawaii. In olden times it was tabu for the king and was relished by him because of its delicate flavor when eaten raw. It is still a highly prized fish and brings a good price on the markets.

This fish is found throughout Polynesia as far as the Hawaiian Islands.

Lauia

114-15 *Callyodon formosus* (Valenciennes)

Plate VI, Figure 2



Drawn from Jordan & Evermann

The lauia is a brightly colored fish. The sides of the body are yellowish green in color and are spotted with reddish. It reaches a length of at least twenty inches.

The lauia is distributed from the East Indies through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Parrot Fish

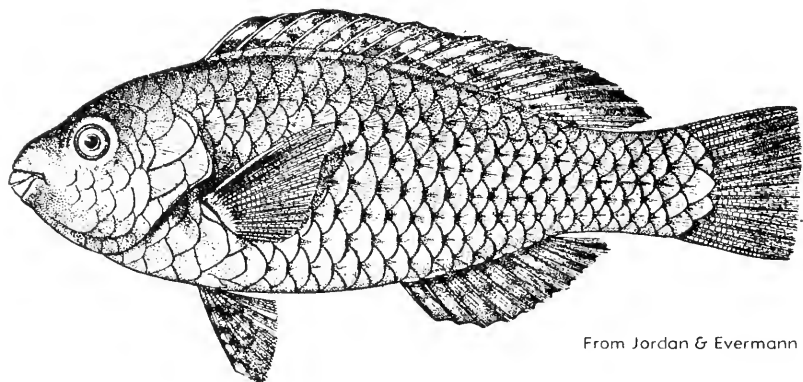
114-16 *Callyodon janthochir* (Bleeker)

This parrot fish is generally uniform in color over most of the body. It is marked by a line from the eye to the chin and another along the upper lip. The dorsal and ventral fins are marked by paler stripes along their margins. It measures at least one foot in length.

This fish is distributed from the Arabian Sea through the West Indies, Melanesia, Micronesia, and Polynesia to the Hawaiian Islands.

Palukaluka

114-17 *Callyodon rubroviolaceus* (Bleeker)



From Jordan & Evermann

This parrot fish is reddish brown in color above and a bright red color beneath. It has no distinct markings. It will reach a length of at least twelve inches.

This fish is distributed from Zanzibar and Arabia through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Parrot Fish

114-18 *Callyodon dubius* (Bennett)

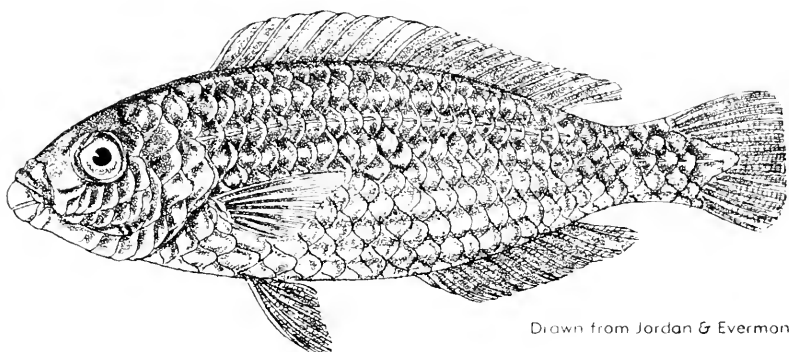
This fish is probably a lead color in life. It is marked by three pale streaks along each side of the abdomen. It reaches a length of at least twelve inches.

This parrot fish is distributed from Mauretius through the East Indies, China, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Plate VIII

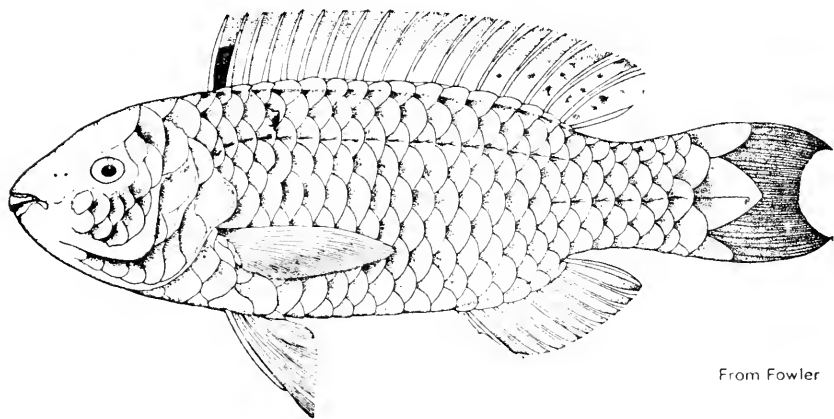


- | | |
|------------------------------|----------------------|
| 1. Wrasse Fish | 7. Humu-humu Hiukole |
| 2. Laenih | 8. Humu-humu Ele-ele |
| 3. Laenih | 9. Wrasse Fish |
| 4. Humu-humu Nuku-nuku Apuaa | 10. Poon |
| 5. Oili or Uwiwi | 11. Oopuhue |
| 6. Humu-humu Nuku-nuku Apuaa | |



Drawn from Jordan & Evermann

Hornbostel's Parrot Fish 114-19 *Callyodon hornbosteli* Fowler



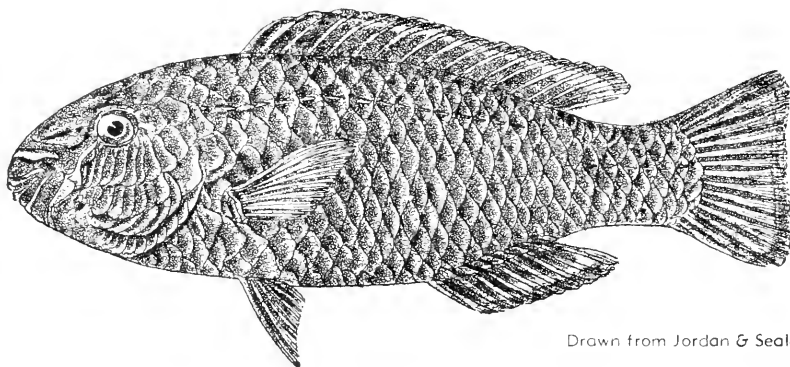
From Fowler

This rare parrot fish is known from only two specimens which were taken at Guam and at Laysan Island. It is marked by an unusual black spot at the front of the dorsal fin.

Parrot Fish 114-20 *Callyodon nuchipunctatus* (Valenciennes)

This parrot fish is marked by a line across the upper lip and by a pair of lines across the lower lip. The scales which cover the front of the body each contain a dark spot. It reaches a length of fourteen inches.

This fish is distributed from Zanzibar through the East Indies, Riu Kiu, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.



Drawn from Jordan & Seale

THE GUAVINA OR SLEEPER FAMILY

115 *Family Eleotridae*

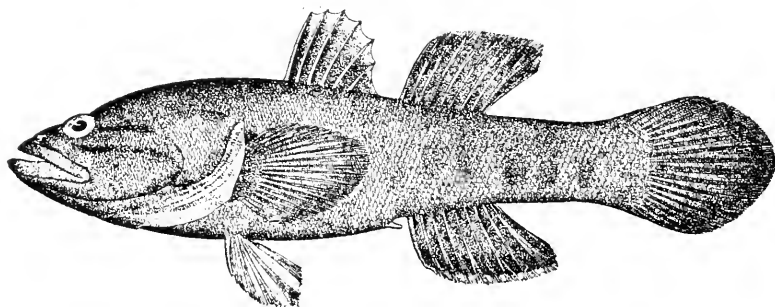
The family of the guavinas and the sleepers are all fishes of small or moderate size. They may be separated from the family of the gobies by the fact that they have their ventral fins separated. Some of the members of the family live in fresh water.

Five members of the sleeper family are known to occur in the Hawaiian Islands.

Oopu Akupa

Also known as Oopu Okupakupa and Oopu Owau

115-1 *Eleotris fusca* (Schneider)



Drawn from Jordan & Evermann

This oopu is a dirty brownish color in life. It is darker above than below and is marked with some dark spots. It reaches a length of nine inches. This fish is one of the most abundant fishes in the fresh and brackish waters about the Hawaiian Islands. It inhabits streams from

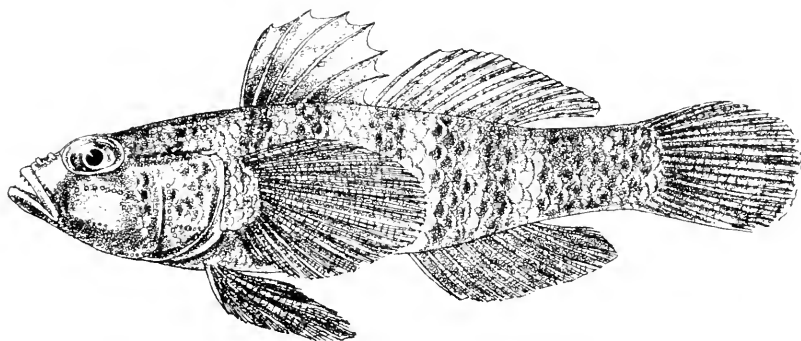
estuaries to the uplands and is often found on sand and mud flats in salt water.

This fish is a slow easy swimmer, but it will show bursts of speed when frightened and will dash to safety beneath rocks and vegetation. Apparently carnivorous, it is reported to feed on snails, shrimps, smaller fish, and insects.

This fish is found on all of the larger islands of the Hawaiian group. It is distributed from Zanzibar, Madagascar, Bourbon, Mauretius, Seychelles, India, Ceylon, Nicobars, Andamans, the East Indies, China, Riu Kiu, Japan, Queensland, Melanesia, Micronesia, and Polynesia.

Oopu

115-2 *Gobiomorphus eugenius* (Jordan & Evermann)



Drawn from Jordan & Evermann

The body of this sleeper is dirty white in color and is marked with vertical bars of brown. A small fish, it reaches a length of at least one and one-half inches.

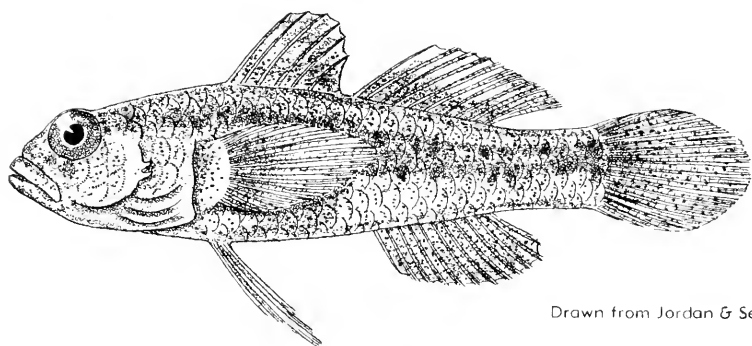
It is known from Laysan Island and the Hawaiian Islands.

Oopu

115-3 *Asterropterix semipunctatus* Russell

This oopu varies from a uniform dark brownish gray to a bluish gray in color. It is darker above than beneath and the sides of the body are marked with six or eight indistinct, dark gray, transverse bands. It reaches a length of at least two and one-half inches.

An uncommon species, this fish does not enter fresh water. It prefers to live in and around corals.

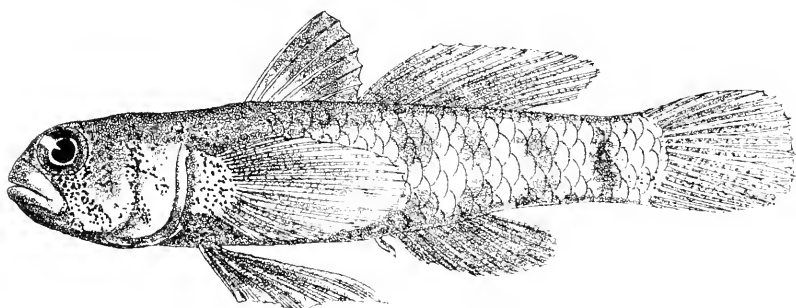


Drawn from Jordan & Seale

This sleeper is distributed from the Red Sea and the Seychelles through Cocos-Keeling, Micronesia, and Polynesia to the Hawaiian Islands.

Sleeper

115-4 *Eviota viridis* (Waite)



Drawn from Jordan & Seale

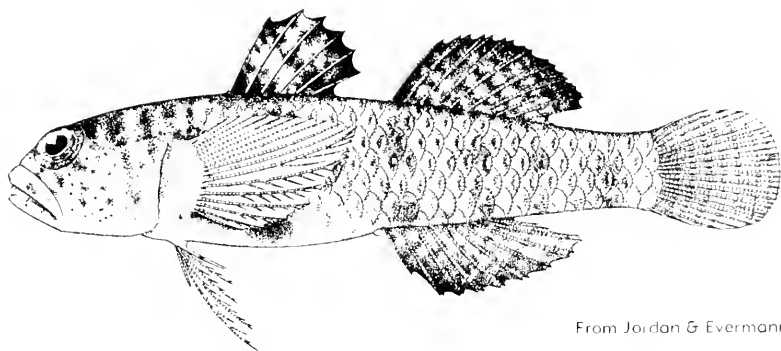
This sleeper is marked with seven vertical stripes on the body which become paler ventrally. A small spot marks the body above the opercle. It reaches a length of at least one inch.

This fish is distributed from Queensland and Lord Howe Island through Polynesia as far as Hawaii and its Leeward Islands.

Oopu

115-5 *Eviota epiphanes* Jenkins

The color of this fish ranges from bright green through blue green to an olive brown color. In general, the body might be considered as bluish in color and covered with brown spots. It is one of the smallest of fishes and reaches a length of only an inch.



From Jordan & Evermann

This fish is abundant among the coral rocks from the shore line to the reef. It is occasionally found in sponges. It does not enter fresh water.

This sleeper is distributed throughout the East Indies and Polynesia as far as the Hawaiian Islands.

THE GOBY FAMILY

116 *Family Gobiidae*

The family of the gobies is a group of fishes which is easily recognized but which is hard to classify. They differ from the *Eleotridae* (Sleepers) by the fact that the ventral fins are united to form a kind of sucker on the lower surface of the body.

They are all of small size and live in warm regions where they inhabit the shore line. Some live in salt water, others live in fresh water and a few go back and forth indiscriminately. Many bury themselves in the mud of shallow estuaries.

Nearly all of the members of the family are too small to be used as food.

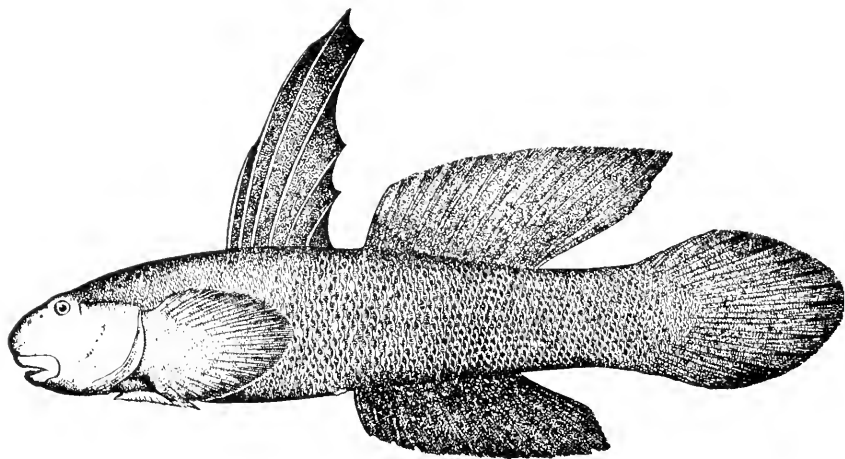
At least fourteen members of this family are known from Hawaiian waters.

Mountain Goby

116-1 *Sicyopterus stimpsoni* (Gill)

This oopu varies in color. It ranges from a dark olive-greenish color above crossed by fourteen black bars to specimens which are almost black. It reaches a length of seven inches.

This fish lives in fresh water streams from the upper valleys to the estuaries. It seems to prefer swift moving water and sits attached to rocks by means of its ventral sucker. It clings and climbs about the rocks with



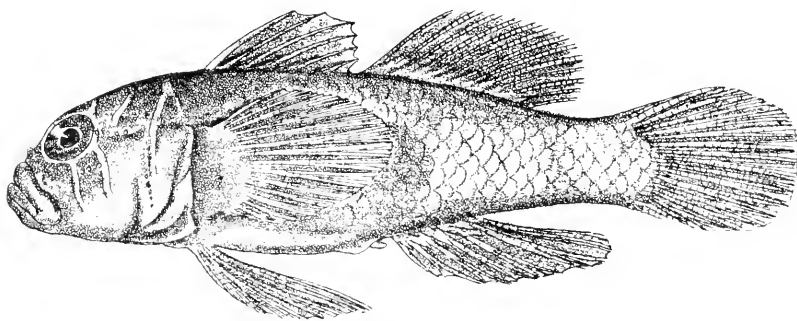
From Jordan & Evermann

its sucker and is even reported to shift its color to match its surroundings. The Hawaiian fishermen were reported to believe that this fish spawns in the ocean during the fall season.

This goby is distributed from the Society Islands to the Hawaiian Islands. It occurs on all of the larger islands of the Hawaiian chain.

Oopu

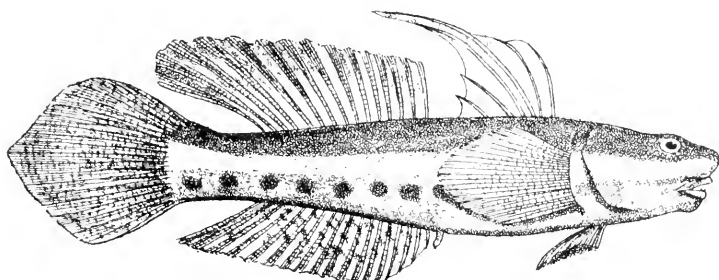
116-2 *Gobiopterus farcimen* Jordan & Evermann



Drawn from Jordan & Evermann

This little goby reaches a length of about two inches. It is an uncommon species and lives in salt water. It has been reported from several of the Hawaiian Islands.

Hawaiian Goby

116-3 *Sicyopterus albotacniatus* (Gunther)

Drawn from Jordan & Evermann

This goby was reported to be olive in color above and is marked by a white band along the middle of the side from the snout to the tail. The lower side of the body is marked by a series of eight round black dots. It reaches a length of six inches.

Although it has not been seen in recent years, this fish is reported to inhabit fresh water brooks.

It is known only from the Hawaiian Islands.

Goby

116-4 *Lentipes seminudus* (Gunther)

This goby is a small fish and measures only about two inches in length.

It is known from the fresh waters of Honolulu and Maui and has not been seen in recent years.

Goby

116-5 *Lentipes concolor* (Gill)

This fish is reported as probably purplish in color in life. It is a small fish and has not been seen in recent years.

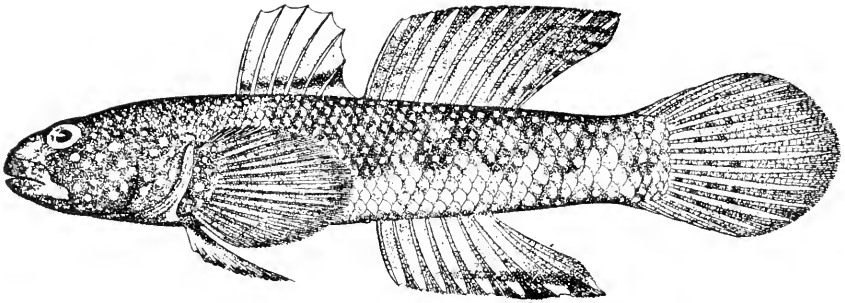
It is known only from the fresh waters of the Hawaiian Islands.

Oopu Ohune

116-6 *Bathygobius fuscus* (Ruppell)

This goby varies in color from reddish olive to brown and is mottled and marked with pearly blue spots. It reaches a length of four inches.

This fish is very abundant in salt water and is sometimes taken in the estuaries. It lives almost anywhere and is found in pot holes, tide



From Jordan & Evermann

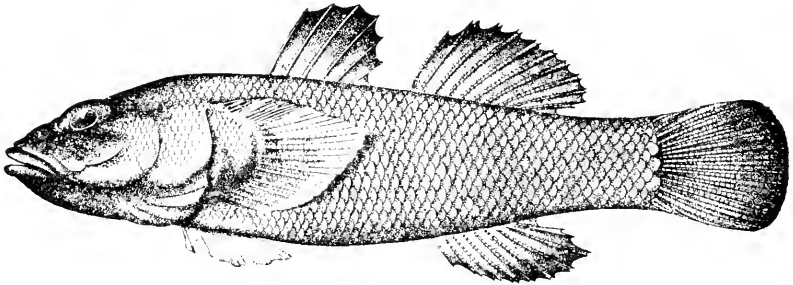
pools, sand flats, mud flats, and other places. It is one of the most abundant of the shore fishes and swims actively about.

This goby probably lives on all of the islands of the Hawaiian chain.

It is found from the Red Sea, Mozambique, and Mauretius, through India, the Andamans, the East Indies, along China and Queensland, and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Pao Opule

116-7 *Chlamydes cotticeps* (Steindachner)



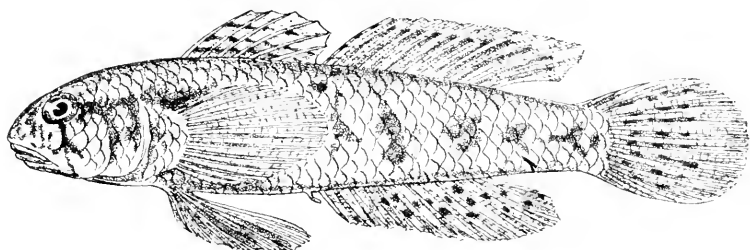
Drawn from Jordan & Evermann

This goby varies in color from individuals which are light to those which are dark. This species is darker above and lighter beneath and in young specimens is marked with four light bands across the body. It may be recognized by its broad head. It reaches two inches in length.

This fish lives along rocky shores, among loose rocks and under stones. It is a fairly common fish and is very hard to catch.

Although it is known only from Oahu, it is probably found on all of the other islands. It is distributed throughout most of Polynesia.

Oopu

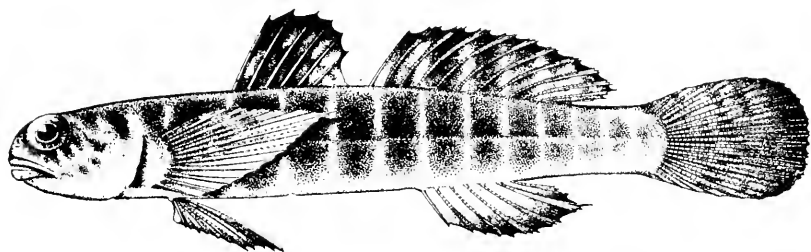
116-8 *Gnatholepis anjerensis* (Bleeker)

From Jordan & Evermann

This goby varies from an olive green to flesh color or tan and is marked with mottlings on the side. It reaches a length of about two inches. This fish lives on salt water mud flats and in brackish water.

It is distributed throughout the East Indies, New Caledonia, Polynesia, Wake, Guam, and the Hawaiian Islands.

Goby

116-9 *Kelloggella oligolepis* (Jenkins)

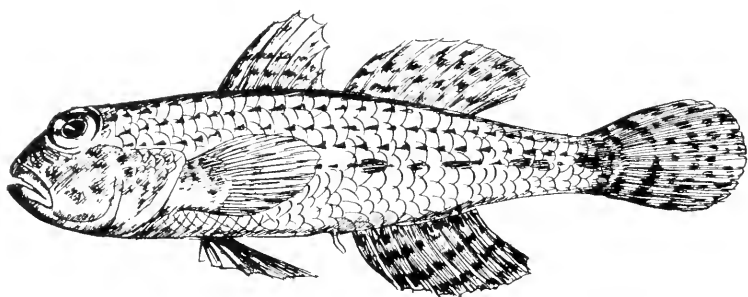
From Jordan & Evermann

This goby is dark in color and is marked with several light cross stripes. One of the smallest of the gobies, it measures only about one inch in length.

This fish lives in the salt water pot holes which are filled by spray from the waves. It swims from place to place by means of short, jerky leaps. It clings to the rocks until the wave has passed and then rises to the surface to see what has been washed into the pool; it then settles to the bottom of the pool.

This fish is reported from the Hawaiian Islands and Easter Island. It is probably much more widely distributed.

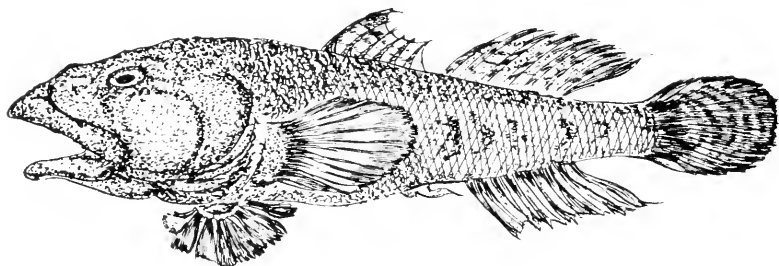
Oopu

116-10 *Opuu nephodes* E. K. Jordan

Drawn from Jordan

This goby is grayish or yellowish-white above and is mottled and streaked with rows of brown markings. It reaches a length of two inches. It is known only from Oahu.

Common River Goby

116-11 *Chonophorus guamensis* (Valenciennes)

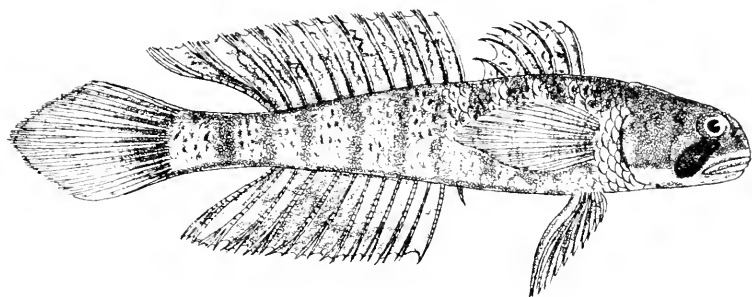
Drawn from Jordan

This goby is a dark olive color in life and is marked with faint blotches or horizontal bars on the side. It is paler above than below and is marked by a blotch at the base of the dorsal fin. It reaches a length of twelve inches.

This goby is one of the most common in the streams and river mouths in the Hawaiian Islands. It is a fresh water species and does not appear to inhabit the salt water.

This goby is distributed along Queensland, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Oopu

116-12 *Chonophorus genivittatus* (Valenciennes)

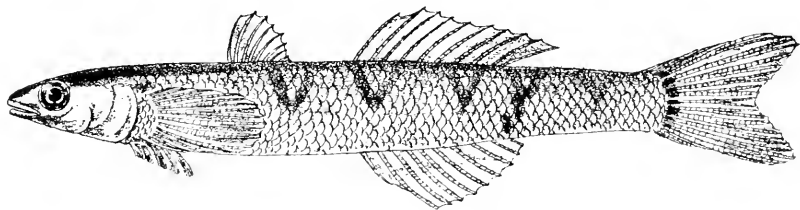
Drawn from Jordan & Evermann

The body of this goby is an olive color in life and is crossed by seven to twelve vertical black bars. It is also marked by a conspicuous black spot beneath the eye. It reaches a length of seven inches.

This oopu inhabits most of the streams of the Islands. It seems to prefer the sandy bottoms of the estuaries and lower valley streams. It becomes less numerous as one ascends the valleys and becomes very scarce in the mountain streams.

A common species, this goby is common in the Hawaiian Islands and is widely distributed throughout the tropical Pacific Ocean. It is found throughout Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Goby

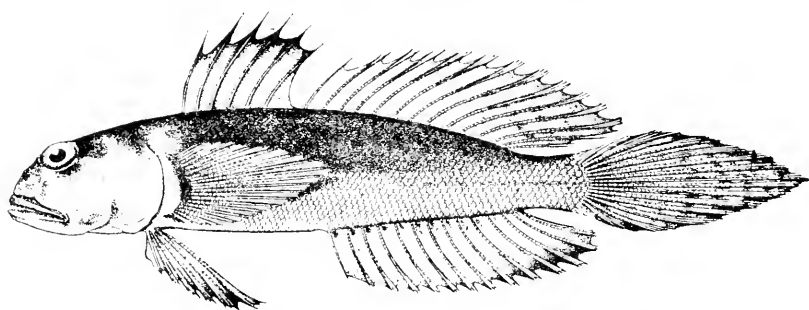
116-13 *Vitraria clarescens* Jordan & Evermann

Drawn from Jordan & Evermann

This goby is marked by about seven V-shaped markings on the back. It reaches a length of about one and one-half inches.

This goby is distributed throughout southern Polynesia and extends as far north as Hawaii and its Leeward Island chain.

Paoo Kaulaloa

116-14 *Gobiichthys papuensis* (Valenciennes)

From Jordan & Evermann

This goby is an olive gray color in life and is marked on the trunk and tail by from six to eleven darker bands. It reaches a length of nearly six inches.

It inhabits both fresh and brackish water. In the Hawaiian Islands, it is known from Oahu and Hawaii but undoubtedly occurs on all of the Islands.

This goby is distributed throughout the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

THE REMORA FAMILY

Also known as the Shark Pilots, Shark Suckers, and Sucking Fishes

117 Family *Echeneidae* (*Echeneididae*)

The remoras are a very unusual group of fishes because they possess a sucking disc on the top of their head by which they attach themselves to larger fishes. This sucking disc is composed of what remains of the first dorsal fin. Over millions of years the dorsal fin has slowly changed until today it remains as a sucking disc placed on the top of the head and neck. It is composed of a series of double, transverse, movable, cartilaginous plates which are serrated on their posterior or free edge and which have been shifted forward on the body until they lie over the head. By means of this disc these fishes attach themselves to other fishes or to floating objects and are carried for long distances in the sea without effort. They attach themselves to sharks, barracudas, swordfishes, turtles, and other free-swimming fishes. They usually drop off their host when it is pulled from the water.

The remoras should not be considered as parasites because they do not derive their nourishment from their host and they do no harm except to impede the progress of the host.

The remoras are carnivorous fishes and feed on sardines, young herring, and scraps left by the host. Even though they lead a somewhat inactive existence, they are rapid swimmers and can overtake fishes to be used either for food or as a host to which to attach themselves.

The members of this family are widely distributed and are found in all seas. Because of the fishes on which they ride, the members of the family are all pelagic in their habits.

Although most of the remoras are small fishes, some of the members of the family reach a length of from three to four feet. Unlike most other fishes, these little creatures are usually dark in color on both the upper and lower sides of the body.

There are many interesting stories about remoras. It is reported that in some places in the tropics these fishes are used for fishing. A fishing line is tied to the tail of the remora and it is sent into the sea to look for a fish. As soon as the remora has attached itself to a fish, the fisherman slowly pulls the two of them up to the boat.

The ancients, especially the Romans, believed that the remora had unusual power. They believed among other things that it could stop or hinder sailing ships. Pliny the Roman tells how a remora stopped, out of the entire fleet, the great galley of the Emperor Caligula thereby foretelling his death. They also believed that the sight or presence of a remora could effect the birth of a child and even determine the outcome of law suits.

Of about ten known species in this family, three are known from the Hawaiian Islands.

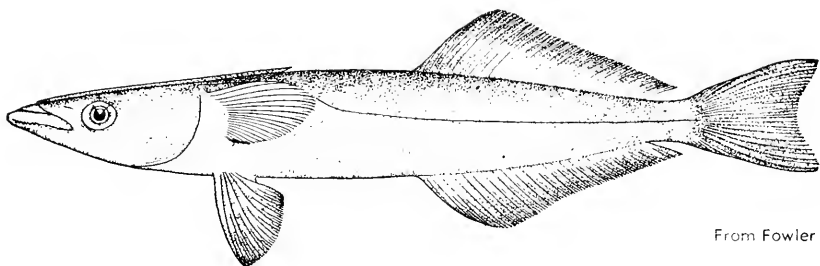
Remora or Keiki o Ka Mano

Also known as the Smaller Remora or Shark Sucker

117-1 *Echeneis remora* Linne

This remora is a uniform violet-black color above and beneath and may be recognized by the presence of eighteen plates in the sucker or cephalic disc. A stouter species, it reaches a length of fifteen inches.

The Hawaiian name of the remora is interesting. Keiki-o-Ka-Mano may be translated literally as "Child of the Shark." It is usually found attached to large sharks.



This remora is distributed throughout the tropical and subtropical Pacific Ocean. It occurs throughout Melanesia, Micronesia, and Polynesia and is found from Japan and Wake to the Hawaiian Islands. It is reported to occur off the Atlantic coast of the United States, throughout the West Indies, Atlantic Ocean, and along the coast of Europe. It is apparently nowhere common.

Remora or Louse Fish

117-2 *Phlebotomus lineatus* (Menzies)

This remora is a small and slender species having but ten plates in its sucker. It reaches a length of at least three inches. It seems to be found more commonly on barracudas and spearfishes and does not seem to attach to sharks. Apparently an uncommon species, it is recorded from Hawaiian waters by a single specimen.

This remora is distributed throughout the tropical Pacific Ocean.

Short Finned Remora

117-3 *Remoropsis brachyptera* (Lowe)

This remora may be recognized by the presence of fifteen plates in its sucking disc and by its long, soft-dorsal fin. It reaches a length of at least twelve inches.

It is distributed throughout the entire Pacific Ocean, although it is not common about the Hawaiian Islands.

THE DRAGONET FAMILY

118 Family *Callionymidae*

The dragonet fishes are all small, scaleless fishes with flat heads. They vary in color and are often marked by unusually high or filamentous fins.

The members of the family are shore fishes of the warm seas and are

most common in the Old World. Some of the Pacific Ocean species are very common in Japan and are caught and eaten as food.

Five members of this family are known to occur in Hawaiian waters.

Hawaiian Dragonet

118-1 *Draconetta hawaiiensis* Gilbert

This dragonet fish is known from a single specimen which was taken near Maui and Molokai between 122 and 132 fathoms. It was a light gray color above and below when preserved in alcohol. It measured about two inches in length.

Dragonet

118-2 *Calliurichthys decoratus* Gilbert

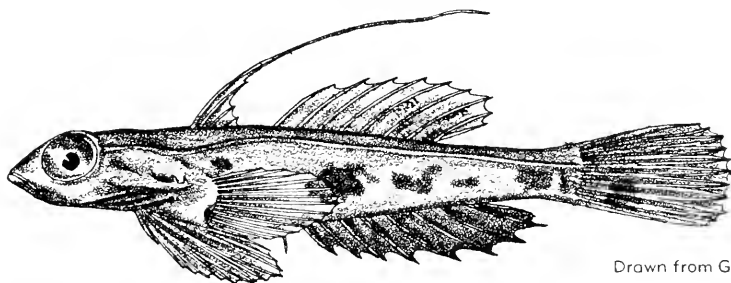


Drawn from Gilbert

This dragonet fish is known only from the Hawaiian Islands. It reaches about fourteen inches in length and has a very long tail. It lives in fairly deep water and was taken between 23 and 52 fathoms.

Dragonet

118-3 *Callionymus rubrovinctus* Gilbert



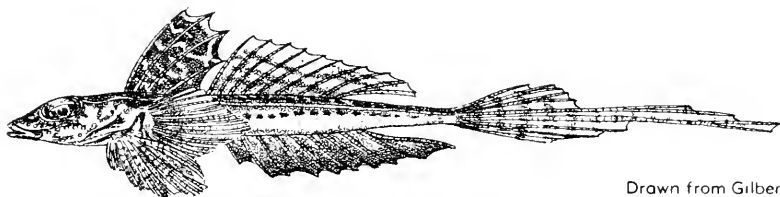
Drawn from Gilbert

This dragonet fish is marked with four bright red bars on the body which extend from the back to nearly the middle of the sides. The lower side of the body is marked with four irregular brownish-black areas. It reaches a length of at least one inch.

This fish inhabits the water between 28 and 43 fathoms and is known only from the Hawaiian Islands.

Dragonet

118-4 *Callionymus caeruleonotatus* Gilbert



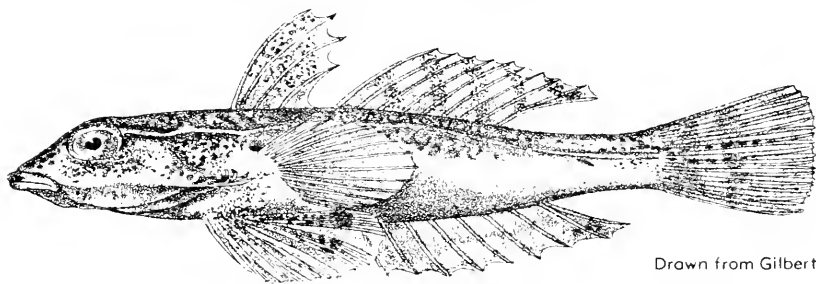
Drawn from Gilbert

This dragonet fish is marked with a dusky golden color and with zig-zag blue lines on its spinous dorsal fin. It reaches a length of at least three inches.

It is known only from the Hawaiian Islands where it occurs in depths from 49 to 176 fathoms.

Dragonet

118-5 *Callionymus corallinus* Gilbert



Drawn from Gilbert

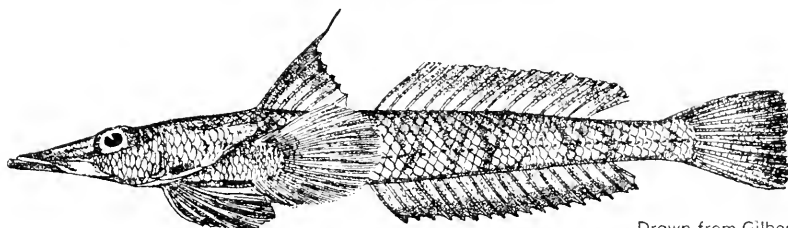
This fish is known from a single specimen taken in the Hawaiian Islands between 32 and 37 fathoms. It measured about two inches in length and, when preserved in alcohol, was a greenish-olive color above and silvery white beneath.

THE PARAPERCID FAMILY

119 *Family Parapercidae*

This family of fishes is a small group containing only a few species. They are all scaly fishes with elongated bodies. Five species of this family are known from the Hawaiian Islands.

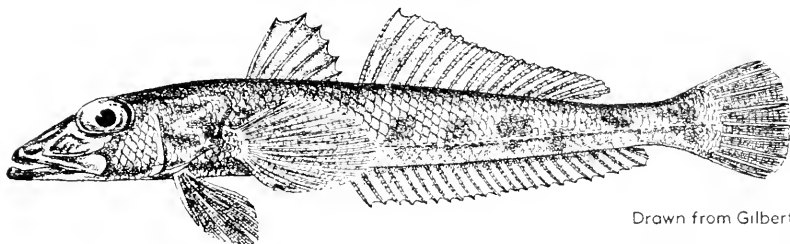
Parapercid

119-1 *Bembrops filifera* Gilbert

Drawn from Gilbert

This fish is known only from the Hawaiian Islands and was taken off Maui between 143 and 202 fathoms. It measured about eight inches in length and when preserved was a light olive-brown in color and grayish on the upper part of the head.

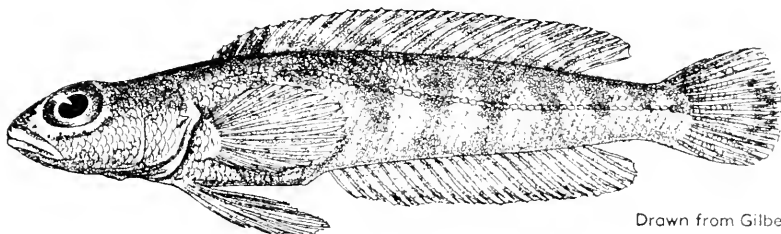
Parapercid

119-2 *Chrionema chryseres* Gilbert

Drawn from Gilbert

This fish is known only from the Hawaiian Islands where it inhabits waters from 95 to 264 fathoms. It measures about eight inches in length and when preserved in alcohol was an olive color speckled with brown above and whitish beneath.

Parapercid

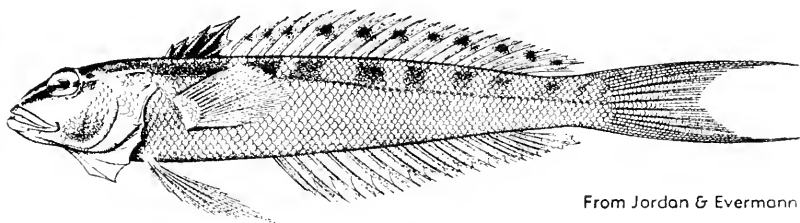
119-3 *Neopercis roseoviridis* Gilbert

Drawn from Gilbert

This fish is known from only two specimens taken off the Island of Maui between 99 and 106 fathoms. These fishes were light rose colored above and the body was crossed by five pairs of green bars and by a single bar across the back of the head. They measured about three inches in length.

Schauinsland's Parapercid

119-4 *Parapercis schauinslandii* (Steindachner)

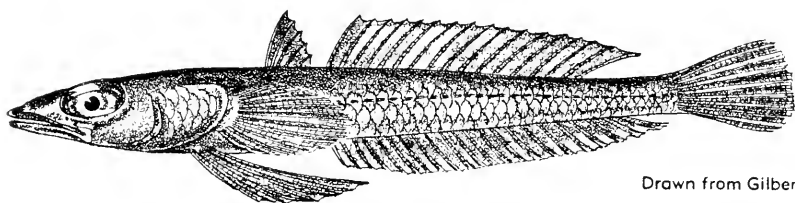


This fish is marked in life with a series of black spots along the dorsal fin and by a red line with a yellow border from the snout through the eye. The first dorsal fin is reddish in color and the body will reach about six inches in length.

This fish is quite common in the Hawaiian Islands.

Parapercid

119-5 *Pteropsaron incisum* Gilbert



In life this fish was probably gray or light brown in color and was marked with black on the first dorsal fin and with a white filamentous tip on the first spine. It measures about two inches in length.

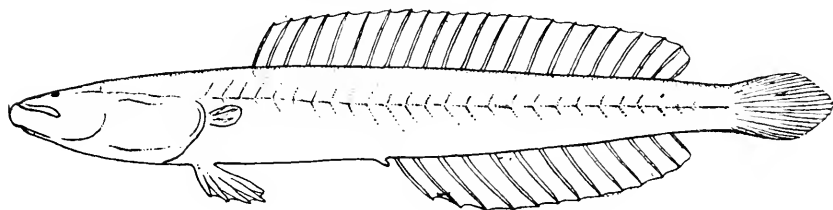
This fish is known only from the Hawaiian Islands and was taken off Laysan Island at 220 fathoms.

TRICHONOTID FAMILY

120 Family *Trichonotidae*

This family of fishes contains only a few small species which are confined to the Indian and Australian seas. Only two species are known from Hawaiian waters.

Samoan Trichonotid

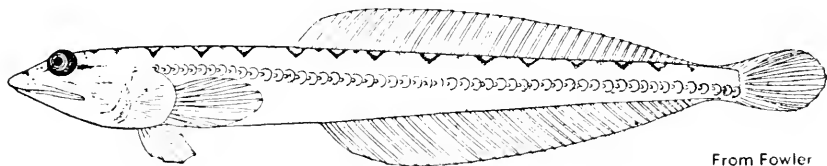
120-1 *Kraemeria samoensis* Steindachner

From Fowler

This fish is a very small species measuring only about one inch in length. Pale in color and with no markings, its body and fins have a transparent appearance. It lives in the wet sand at the edge of the tide.

This fish inhabits southern Polynesia and occurs as far northward as the Hawaiian Islands.

Cooke's Trichonotid

120-2 *Crystallodytes cookei* Fowler

From Fowler

This fish is small in size and measures little more than an inch in length. It is known only from Oahu.

THE SAND LANCE FAMILY

Also known as the Launces or Lants

121 Family *Ammodytidae*

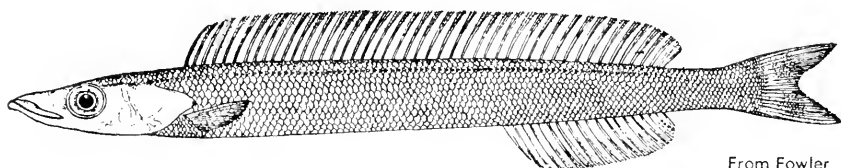
The sand lances are a family of small, slender, silvery, toothless fishes in which the body is covered by many cross folds of skin. The members of the family are all small, salt-water fishes and are found in northern

seas from the Arctic to the Tropics. They swim in immense schools and are often so abundant that they furnish both food and bait. They provide food for salmon and other fishes and are eaten by the Japanese. Because they swim in immense schools they are often left stranded on the beaches by receding tides. They will often imbed themselves in the sand and remain there until the tide returns.

Only one member of this family is known from the Hawaiian Islands.

Gill's Sand Lance

121-1 *Bleekeria gillii* T. B. Bean



From Fowler

This species of sand lance is known from the Hawaiian Islands by a single specimen taken off Pearl and Hermes Reef in 1923. It reaches a length of at least three inches.

CHAMPSODONTID FAMILY

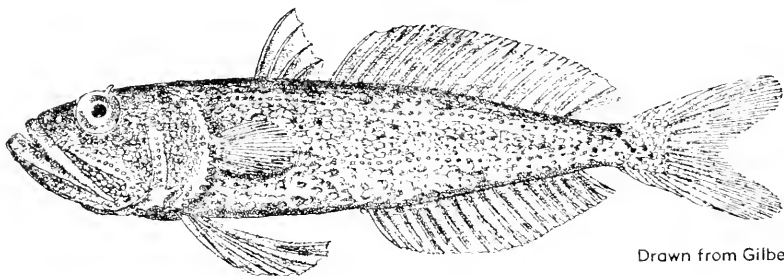
122 Family *Champsodontidae*

The members of this family of fishes are covered with numerous lateral cross lines and hairs. They are a small group of fishes found in the waters surrounding Japan and the East Indies.

A single member of this family is known to occur in Hawaiian waters.

Champsodontid

122-1 *Champsodon fimbriatus* Gilbert



Drawn from Gilbert

The body of this fish is darker above than beneath, is speckled on the sides, and is covered with projecting papillae. It reaches a length of about four inches.

This fish is known only from the Hawaiian Islands and was taken in Pailolo Channel between 122 and 143 fathoms.

THE BLENNY FAMILY

123 Family *Blenniidae*

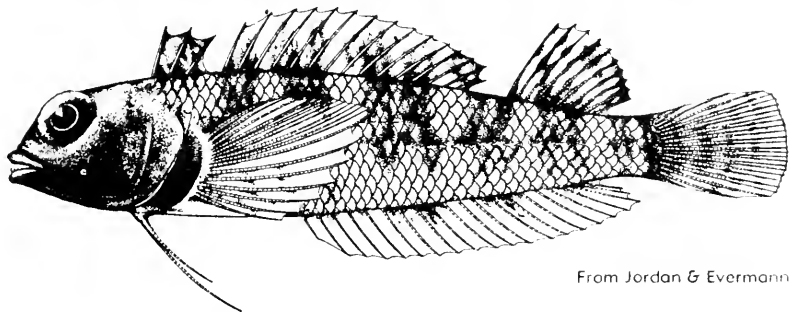
The family of the blennies includes a very large number of species ranging in length from two inches to two feet in the case of the giant kelp fish of California. They are widely distributed from the tropics through the temperate regions to the arctic zone and nearly all live along the shorelines. A few inhabit the fresh water lakes of Italy. They all have elongated bodies, with many dorsal spines and some have serrated teeth which are set loosely in the jaw. The tropical forms differ from the arctic forms by having fewer vertebrae. They are interesting looking fishes although they are all dark in color.

In habits the blennies are most unusual. They are both carnivorous and herbivorous and give birth to their young alive (viviparous). Most of them live in rock pools or near shore. One group of blennies called the rock skippers are interesting. They live in the rock pools of the tropics, where they leap from rock to rock when disturbed.

Of more than 500 species in this family, fourteen are known from the Hawaiian Islands.

Blenny

123-1 *Enneapterygius hemimelas* (Kner & Steindachner)



From Jordan & Evermann

This blenny is marked on the side of its body with six pairs of dark, closely set, vertical bars. It reaches a length of one and one-half inches and is common in holes in coral rocks.

It is distributed through Micronesia and Polynesia as far as the Hawaiian Islands.

Blenny

123-2 *Petroscirtes filamentosus* (Valenciennes)

The body of this blenny is darker above than beneath and is marked by a band along the side of the body from the snout to the tail. It measures about two inches in length.

This fish is distributed throughout the East Indies and Polynesia as far northward as the Hawaiian Islands.

Blenny

123-3 *Blennius sordidus* Bennett

This blenny is darker above than beneath and is marbled over its body. It reaches a length of four inches. It occurs in the Hawaiian Islands.

Pao Kauila or Oopu Pao

123-4 *Cirripectes brevis* (Kner)

This blenny is spotted with brown spots, each having a yellowish tinge. The ground color of the body is whitish. It reaches a length of five inches.

This blenny is distributed from Ceylon through Micronesia and Polynesia as far as the Hawaiian Islands. It is not a common species in the Hawaiian Islands.

Blenny

123-5 *Cirripectes alboapicalis* (Ogilby)

The body of this blenny is uniformly dark in color. It reaches a length of about six inches. It is known from Lord Howe Island and from the Hawaiian Islands and its leeward chain.

Blenny

123-6 *Cirripectes variolosus* (Valenciennes)

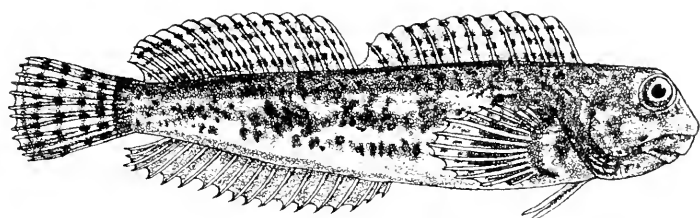
The body of this blenny is uniformly dark in color and reaches about three inches in length.

This fish is distributed through Micronesia and Polynesia as far as Easter Island and the Hawaiian Islands.

Rock Skipper

124-7 *Salarias marmoratus* (Bennett)

The body of this fish varies in color but is generally spotted with brownish. It reaches a length of about six inches.

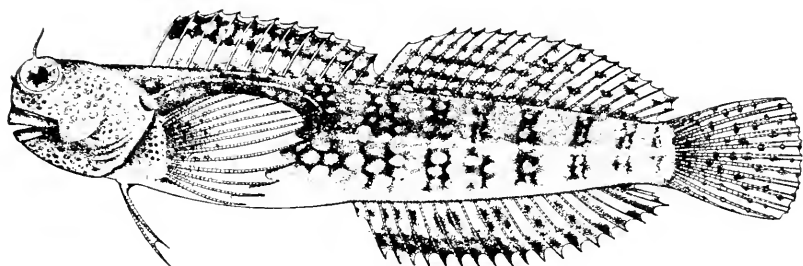


Drawn from Jordan & Evermann

This fish is distributed from Mauretius, through Ceylon, Melanesia, and Polynesia as far as Easter Islands and the Hawaiian Islands.

Rock Skipper

123-8 *Salarias gibbifrons* Quoy & Gaimard



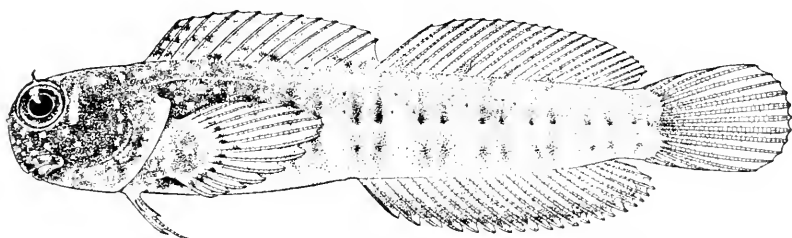
From Jordan & Evermann

Generally brownish over its body, the color of this fish varies. It reaches a length of at least three inches.

This fish is distributed throughout southern Polynesia. It extends as far north as Hawaii, Wake, and Johnston Islands.

Rock Skipper

123-9 *Salarias edentulus* (Schneider)



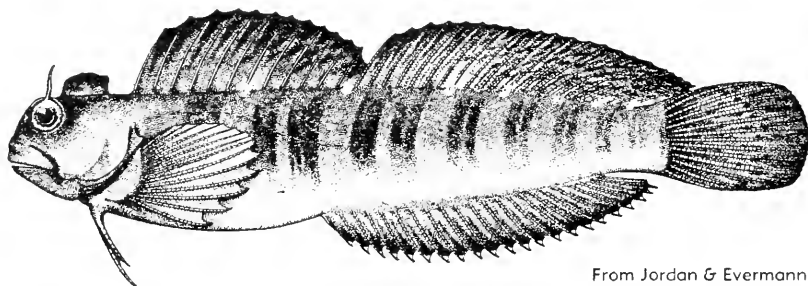
From Jordan & Seale

This rock skipper reaches a length of at least four inches.

This species is distributed from the Red Sea, Madagascar, Bourbon, Mauretius, and the Seychelles through India, the East Indies, along China and Queensland, and through Melanesia and Polynesia as far as the Hawaiian Islands.

Zebra Rock Skipper

123-10 *Salarias zebra* Valliant & Sauvage



From Jordan & Evermann

This rock skipper varies in color from reddish through brownish to blackish. It may or may not be marked with cross bars on the sides of the body. It reaches a length of at least six inches. It is a leaping fish and is very common about the coral and tide pools.

This fish is known from the Hawaiian Islands and its leeward group.

Rock Skipper

123-11 *Salarias meleagris* Valenciennes

This rock skipper is described as well marked and as most easily distinguished from its relatives by its crenulated upper lip, its entire lower lip, its branched supraocular tentacles, the absence of lower canine teeth, and by the fact that the dorsal fin is notched between the spines and the rays. The body is marked with small light spots.

This fish is distributed from Zanzibar and Bourbon, through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Rock Skipper

123-12 *Salarias lineatus* Valenciennes

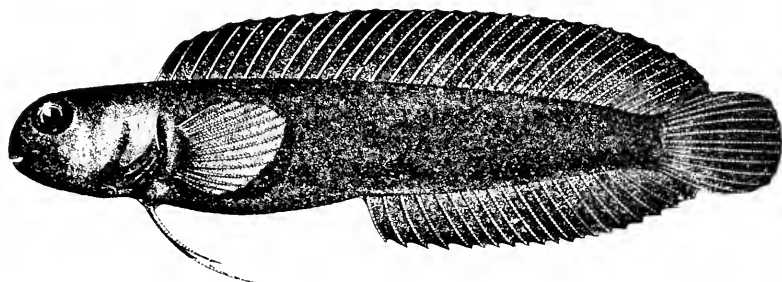
The body of this fish is nearly uniform in color. It reaches a length of at least four inches.

This fish is distributed from the Red Sea through India, the Andaman

Islands, the East Indies, along Queensland, and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Blenny

123-13 *Enchelyurus ater* (Gunther)



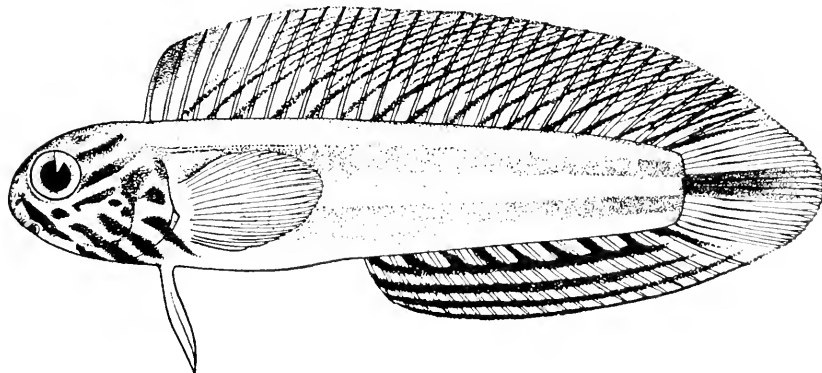
From Jordan & Evermann

This blenny is nearly uniform black in color and reaches a length of at least one inch. It is one of the smallest inhabitants of the coral reefs.

This species is distributed from New Guinea through southern Polynesia to Hawaii and its Leeward Island chain.

Edmondson's Blenny

123-14 *Enchelyurus edmondsoni* Fowler



From Fowler

This little blenny is named for Dr. Charles Howard Edmondson, Professor of Zoology at the University of Hawaii.

This fish is known only from the Island of Molokai.

THE EEL-LIKE BLENNY FAMILY

124 *Family Congrogadidae*

This family includes a few eel-shaped blennies found mostly along the coast of Asia and adjacent Pacific waters.

This family is represented in Hawaiian waters by a single species.

Eel-Like Blenny

124-1 *Congrogadus marginatus* Valliant & Sauvage

This fish is known only from the Hawaiian Islands. When preserved, it was of a uniform brown color and measured about four inches in length.

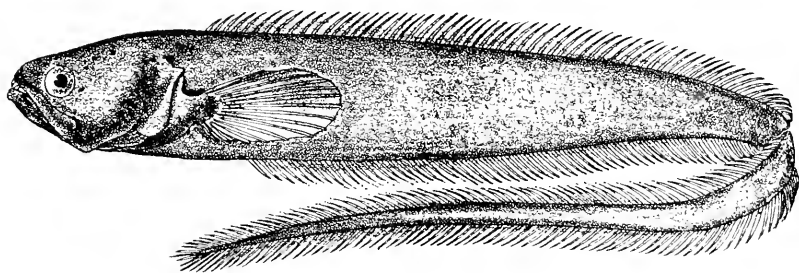
LYCODAPODIID FAMILY

125 *Family Lycodapodiidae*

The members of this family of fishes are all deep sea species which have been dredged from the North Pacific Ocean. They are all small, scaleless, and are without ventral fins and a lateral line.

Of four known species, one has been recorded from the Hawaiian Islands.

Lycodapodiid

125-1 *Snyderidia canina* Gilbert

Drawn from Gilbert

This deep sea fish, known only from the Hawaiian Islands, was taken off Kauai between 385 and 500 fathoms. It was probably a light grayish color in life and covered with pigment spots. It measured about twelve inches in length.

THE DEEP WATER BLENNY OR BROTULID FAMILY

126 Family *Brotulidae*

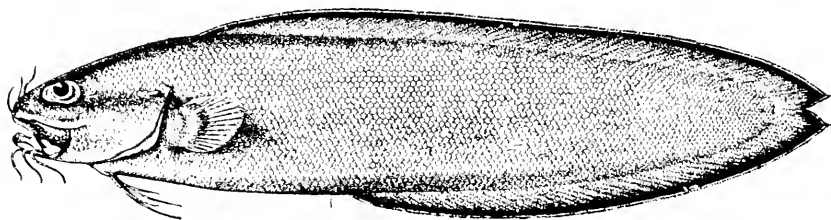
The brotulids are a large family of fishes somewhat resembling the cod fishes. They are tropical fishes with large gill openings and minute scales. In general, they are fishes of the ocean depths with comparatively few species living in shallow water. Two of the species, living in land locked caves in Cuba, have degenerated into blind cave fishes.

This family is represented in the Hawaiian Islands by a single shallow water species.

Puhi Palahoana

Also known as the Puhi Hoana or Hoana

126-1 *Brotula multibarbata* Schlegel



From Jordan & Evermann

The puhi palahoana is a brown color in life and is a little darker above than beneath. It is conspicuously marked by barbels about the mouth. The upper lip is equipped with four long and six short barbels, while the lower lip has six very long barbels. It reaches a length of at least two feet.

This fish is known from the Indian Ocean, Japan, and the Hawaiian Islands.

THE PEARL FISH FAMILY

127 Family *Carapidae* (*Fierasferidae*)

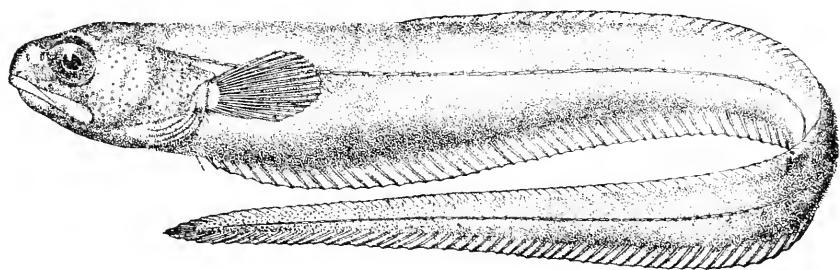
The pearl fishes are a family of small, very slender, transparent fishes. They have eel-shaped bodies, fairly large heads, and are quite numerous in the warm seas. Some of the species are dark in color and have been found both within sea cucumbers and among lava rocks. The family gets its name from the pearly luster of the body. The species are fairly numerous and seem to be confined to warm seas.

These fishes are remarkable in that they are often found living inside of pearl oyster and sea cucumbers.

This family is represented in the Hawaiian Islands by two species.

Pearl Fish

127-1 *Carapus homei* (Richardson)



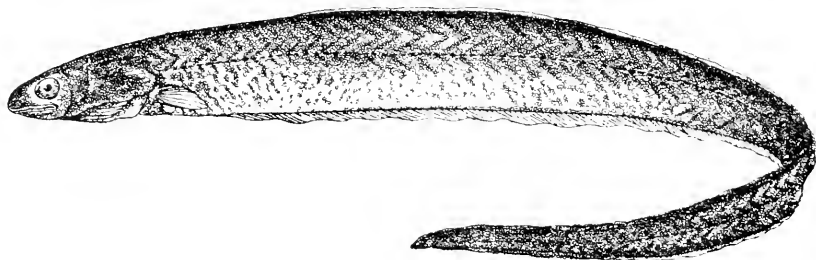
From Gilbert

This pearl fish is of a whitish, translucent color and is marked with a slight luster and a few pigment spots. It reaches a length of six inches and occurs from the surface to depths of about forty fathoms. Like other members of its family, it lives within the body of sea cucumbers.

This species is distributed from Bourbon through the East Indies, along Queensland, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Pearl Fish

127-2 *Jordanicus gracilis* Bleeker



Drawn from Jordan & Evermann

This pearl fish is a pale olive color in life and is marked with pale greenish spots. It measures about six inches in length.

This fish is distributed from Natal through the East Indies, Micronesia, and Polynesia as far northward as the Hawaiian Islands.

THE TRIGGER FISH FAMILY

128 Family *Balistidae*

The trigger fishes are an interesting family of tropical shore fishes. They get their common name of trigger fish from the trigger on the top of their backs. This trigger is composed of two or three movable spines representing the first dorsal fin. These spines may be stood erect or folded into the back. When erect the first spine, which is very large and strong, is usually locked in place by the spine behind it. The pelvic fin is likewise replaced by a spine which together with the trigger forms a convenient method of locking the fish into corners in rocks when it desires to rest. These spines are so strong that once a fish has wedged himself into a corner for the night with them, he may not easily be removed. The trigger fishes all have strong jaws and a skin covered with rough, regularly arranged scales.

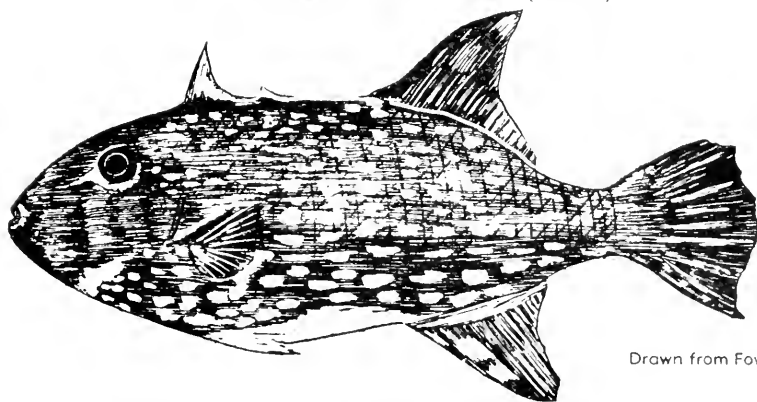
These fishes are carnivorous in their habits but in spite of this do sometimes consume plant food.

The trigger fishes are reputed to be poisonous and are very seldom used as food. The tropical species contain an offensive alkaloid which causes a disease called ciguatera. These poisons seem to become weaker in the more northern species.

Of this interesting family, only twelve species are known from the Hawaiian Islands.

Spotted Trigger Fish

128-1 *Canthidermis maculatus* (Bloch)



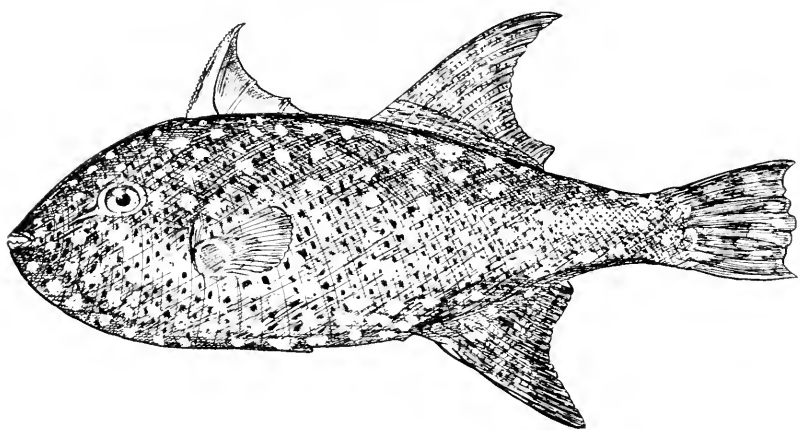
Drawn from Fowler

The body of this trigger fish is covered by a network of lines and a large number of light colored spots. The body of this fish is more slender and elongated than that of other species, the dorsal and anal fins are somewhat falcate, and the ventral spine is set well toward the front of the body. It reaches a length of twelve inches.

The trigger fish is very uncommon in Hawaiian waters and is only rarely brought ashore. It is distributed from the Cape of Good Hope eastward along India and China and through the East Indies, Melanesia, and Polynesia as far as the Hawaiian Islands. This species also occurs in the tropical and subtropical waters of the Atlantic Ocean.

Trigger Fish

128-2 *Canthidermis rotundatus* (Proce)



Drawn from Jordan & Jordan

This trigger fish reaches a length of at least five inches. Alcoholic specimens are described as buff in color being more brownish above than below.

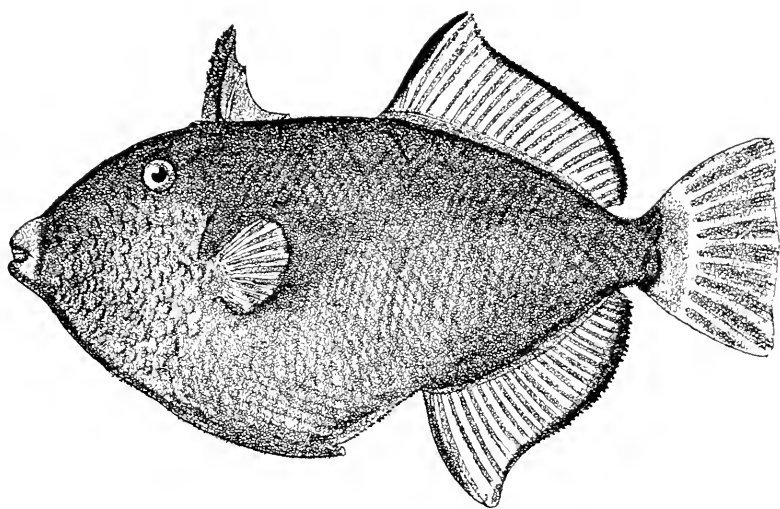
This species is uncommon in the Hawaiian Islands. It is distributed throughout the East Indies and Melanesia, and extends as far as the Hawaiian Islands.

Humuhumu Hiukole or Humuhumu Uli

128-3 *Balistes vidua* Richardson

Plate VIII, Figure 7

This trigger fish is uniformly dark brown in color and is marked with an olive tinge. The soft dorsal and the anal fins are white in color, the



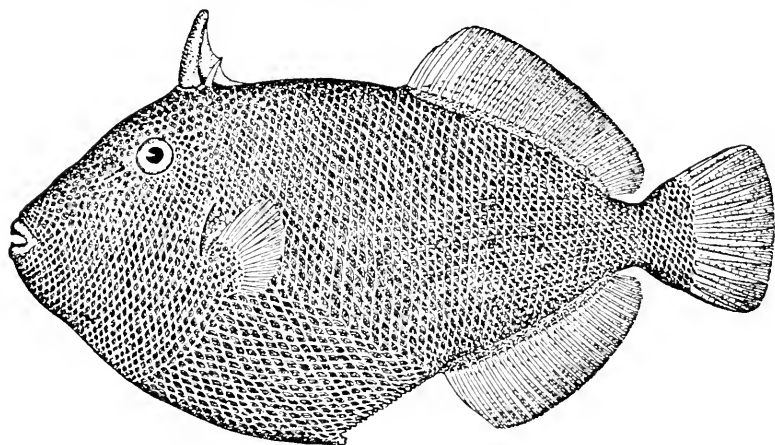
Drawn from Jordan & Evermann

pectoral fin is yellowish, the caudal peduncle is white, and the caudal fin is reddish in color. Specimens may reach a length of ten inches.

This fish is common in Polynesia. It is distributed throughout the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Trigger Fish

128-4 *Balistes nycteris* (Jordan & Evermann)



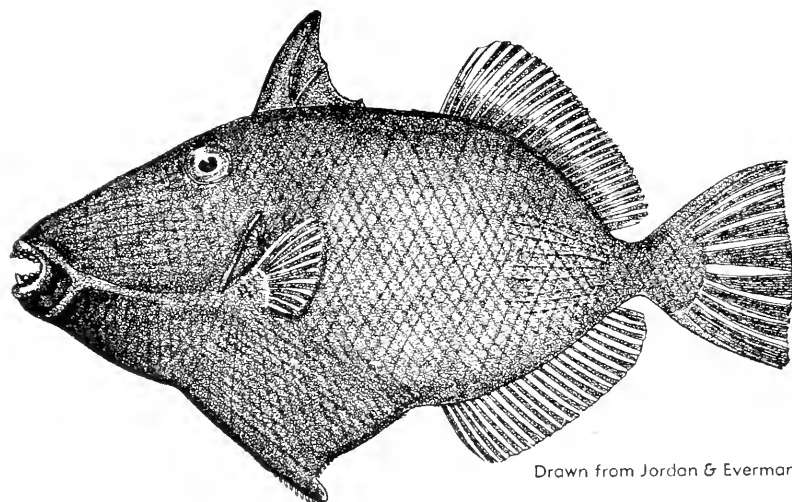
From Jordan & Evermann

This trigger fish may be recognized by the presence of four horizontal lines on the soft dorsal fin and by a few lines radiating out from the eye. It is brownish in color in alcohol. It reaches a length of at least seven inches.

This fish is known only from the Hawaiian Islands.

Humuhumu Mimi

128-5 *Balistes capistratus* Shaw



Drawn from Jordan & Evermann

This trigger fish is a uniform light brown color over the body and is marked by a rose colored line about the mouth. It reaches a length of at least twelve inches. It is a common species about Hawaii.

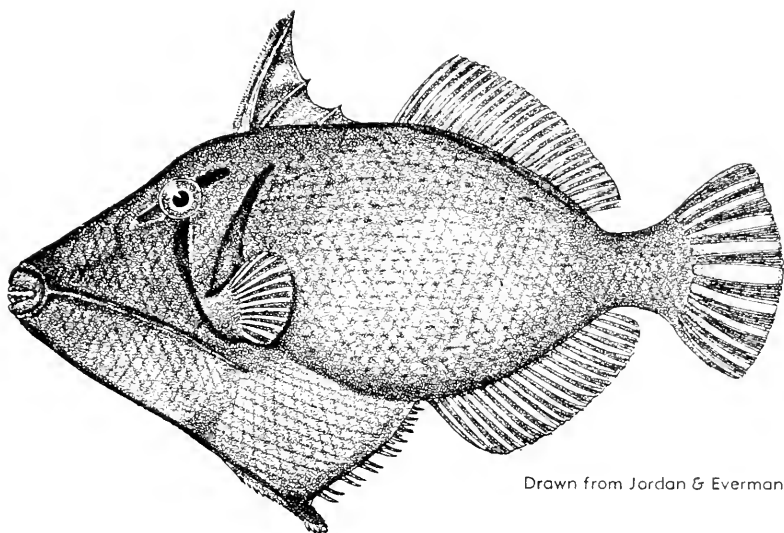
This trigger fish is distributed from Zanzibar, Natal, Madagascar, Reunion, and Mauretius through the East Indies, along China and Queensland, and through Melanesia and Polynesia as far as the Hawaiian Islands.

Humuhumu Lei

128-6 *Balistes bursa* Schneider

This trigger fish is a light drab color above and whiter beneath and is marked by a white line running from the mouth backward onto the body. A pair of curved vertical lines extend from the region of the eye downward onto the body. It reaches a length of about eight inches.

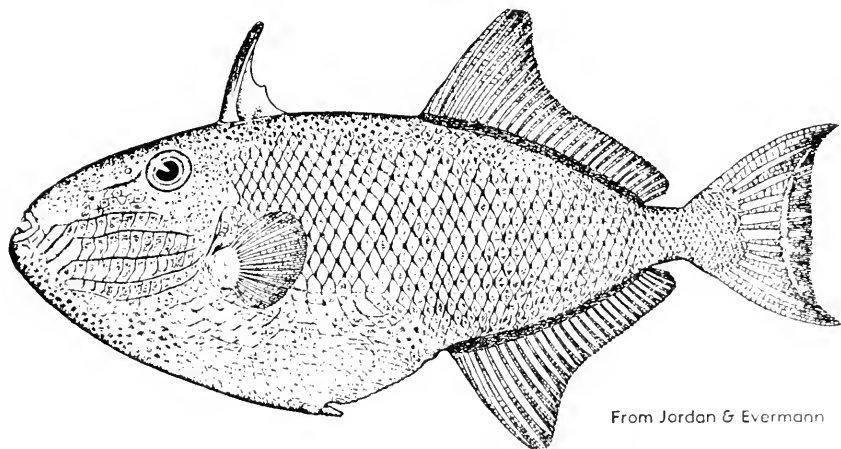
This species is common about the Hawaiian Islands and is abundant throughout Polynesia. It is distributed from the Red Sea, East Africa,



Drawn from Jordan & Evermann

Madagascar, Bourbon, and Maurerius through the East Indies and Polynesia as far as the Hawaiian Islands.

Trigger Fish 128-7 *Balistes ringens* Linne



From Jordan & Evermann

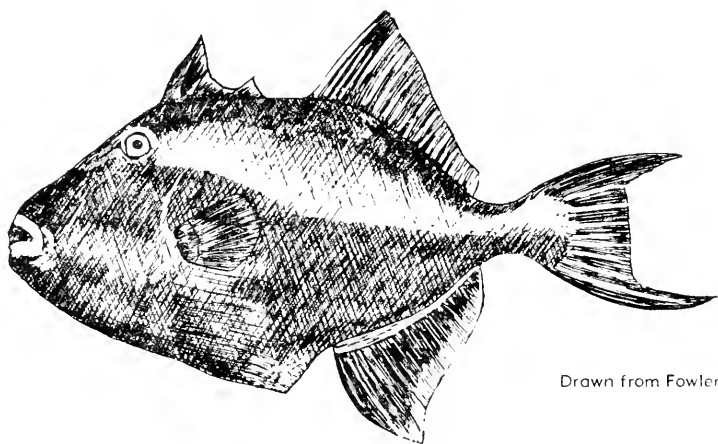
This trigger fish is one of the most beautiful of its family. It is a clear violet color over the body and is marked on the cheek by a series

of three or four violet black horizontal lines. The sides of the body are marked with violet blue spots on the scales which form interrupted longitudinal lines. The upper and lower border of the caudal fin is violet red in color. This fish has a protruding lower jaw and the scales on the tail are keeled. It reaches a length of about ten inches.

This trigger fish is distributed from Mauretius through the East Indies, to the Hawaiian Islands and as far as the coast of California and Mexico. It is found in both the tropical Atlantic and Pacific Oceans.

Trigger Fish

128-8 *Balistes fuscus* Schneider



Drawn from Fowler

This trigger fish is dark brown in color when preserved in alcohol. It reaches a length of twenty inches and is one of the largest members of the family.

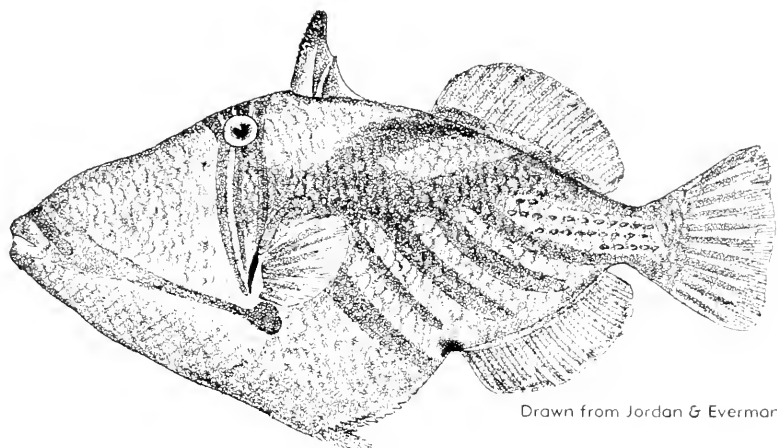
This trigger fish is distributed from the Red Sea, Zanzibar, and Bourbon through the East Indies, Melanesia, Micronesia, and Polynesia as far northward as the Hawaiian Islands.

Humu-humu Nuku-nuku A-puaa

128-9 *Balistapus aculeatus* (Linne)

Plate VIII, Figure 4

This trigger fish is a yellowish green color above and whitish beneath. It is marked with an unusual pattern of blue, yellow, greenish, and black bars and stripes. It reaches a length of ten inches. It is common throughout Polynesia.



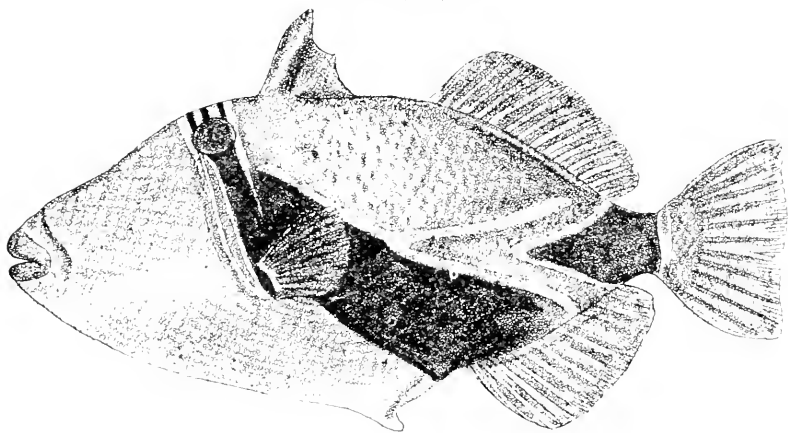
Drawn from Jordan & Evermann

This species is distributed from West Africa, the Red Sea, Zanzibar, Mozambique, Mauretius, and the Seychelles, through the East Indies, along Queensland and China, and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Humu-humu Nuku-nuku A-puaa

128-10 *Balistapus rectangulus* (Schneider)

Plate VIII, Figure 6



Drawn from Jordan & Evermann

This trigger fish is a light brown in color over the upper part of the head and body. It is lighter in color over the head and lower surface of the body and is conspicuously marked by bars and stripes of black, green, violet, and yellow. It reaches a length of nine inches.

The translation of this Hawaiian name is interesting. Humu-humu means a needle and refers to the spine or trigger and also to the entire group of trigger fishes. Nuku-nuku is variously translated as snout or grunt and puaa means pig. So the name comes to mean the trigger fish with the snout of a pig or the grunt of a pig. This fish is one of the most common trigger fishes in the Hawaiian Islands.

This species is distributed from the Red Sea, Zanzibar, Mozambique, and India through the East Indies, along China, and through Japan, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Trigger Fish

128-11 *Balistapus undulatus* (Mungo Park)

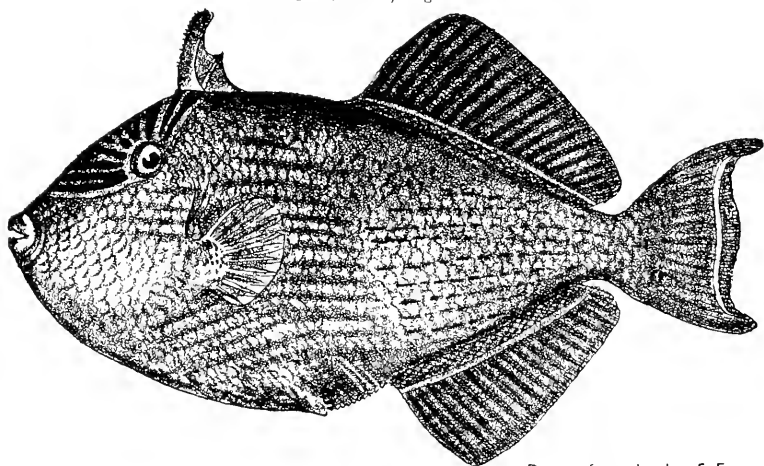
The body of this fish is dusky in color and is marked by a great many oblique lines. The fins are light in color at their edges but become darker at their bases. A dusky spot marks the base of the tail. This fish reaches a length of ten inches. It is common through Polynesia as far as Japan.

This species is distributed from the Red Sea, Zanzibar, and Mozambique through the East Indies, the Philippine Islands, along China, through Japan, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Humu-humu Ele-ele

128-12 *Melichthys buniva* (Lacepede)

Plate VIII, Figure 8



Drawn from Jordan & Evermann

This trigger fish is a dark greenish-bluish color in life and turns black when it is dead. It is conspicuously marked by a light blue line along

the bases of the soft dorsal and the anal fins. It reaches a length of about twelve inches.

This species is distributed from Zanzibar through the East Indies, along China, and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

THE FILE FISH FAMILY

Also known as the Leather Jackets or Fool Fishes

129 Family Monacanthidae

The file fishes resemble in many ways the members of the trigger fish family. They are small and less brightly colored than the trigger fishes and have but a single spine on the back instead of the three found in the trigger fishes. The skin of these fishes is usually of a rough, velvety texture and the scales are reduced in size and are shagreen-like in texture.

The file fishes have no economic importance. They are mostly small in size or bony and contain little palatable flesh. Those which might be eaten are usually of a bitter taste.

Herbivorous in their habits, they abound in the tropics and temperate seas of the Pacific Ocean. They do not occur in Europe.

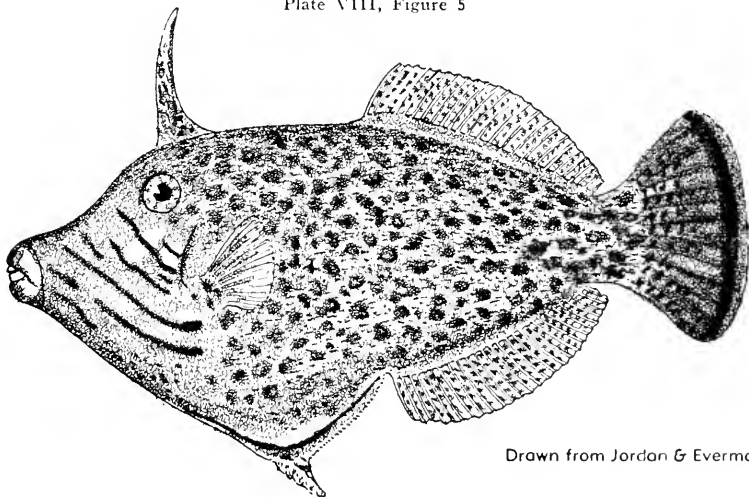
At least seven members of the family occur in Hawaiian waters.

Oili or Uwiwi

Also known as the Fantail File Fish or Oeoe

129-1 *Monacanthus spilosoma* Lay & Bennett

Plate VIII, Figure 5



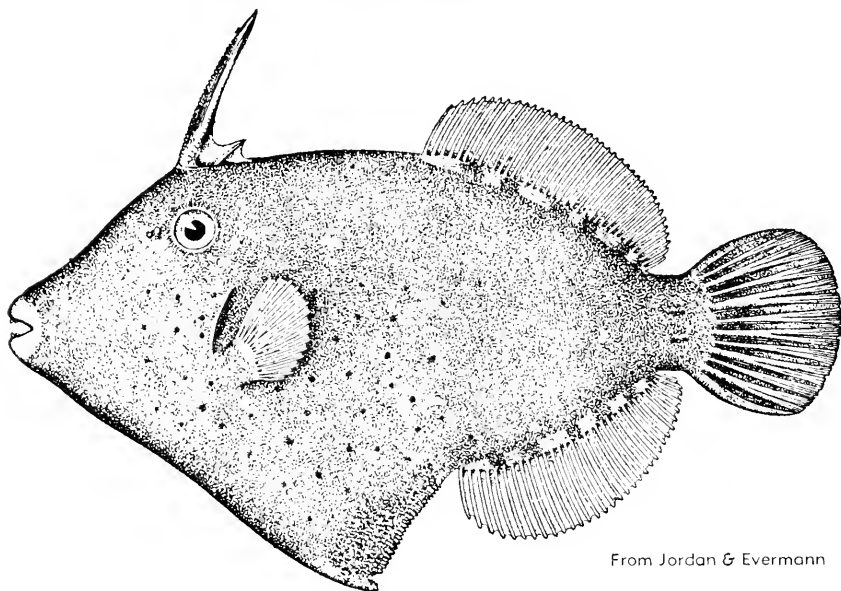
Drawn from Jordan & Evermann

This file fish is yellowish in color over its body and is marked with many irregular, closely set, black spots. The cheek is marked by diagonal black lines and the tail is usually of a brilliant red color and spotted with black. It reaches a length of about six inches.

This file fish is found throughout Hawaii and its Leeward Islands.

Oili-lepa or Ohua

129-2 *Cantherines sandwichiensis* (Quoy & Gaimard)



From Jordan & Evermann

This file fish is a brownish black color over its entire body. The soft dorsal and anal fins are orange in color. It reaches a length of about fourteen inches.

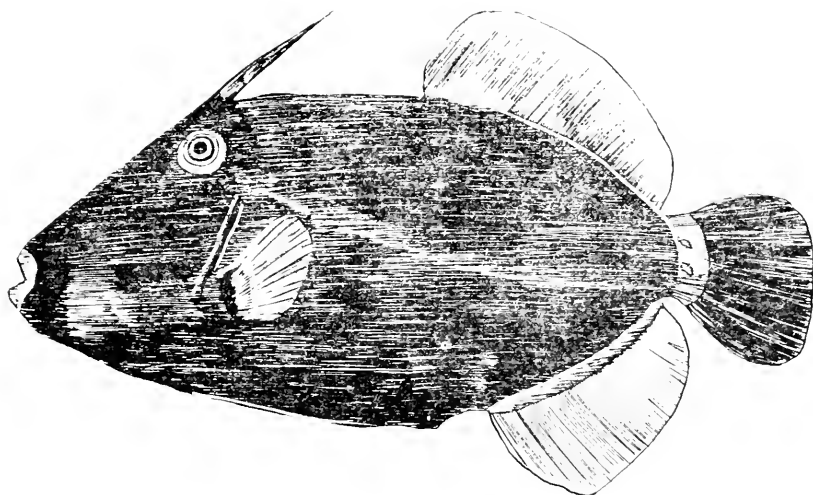
This fish is distributed from Mauretius through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

File Fish

129-3 *Cantherines pardalis* (Ruppell)

This species is brownish in color over most of its body. The dorsal and anal fins are lighter in color while the caudal fin is dark. It reaches a length of at least eight inches.

This file fish is distributed from the Red Sea and Zanzibar, to the

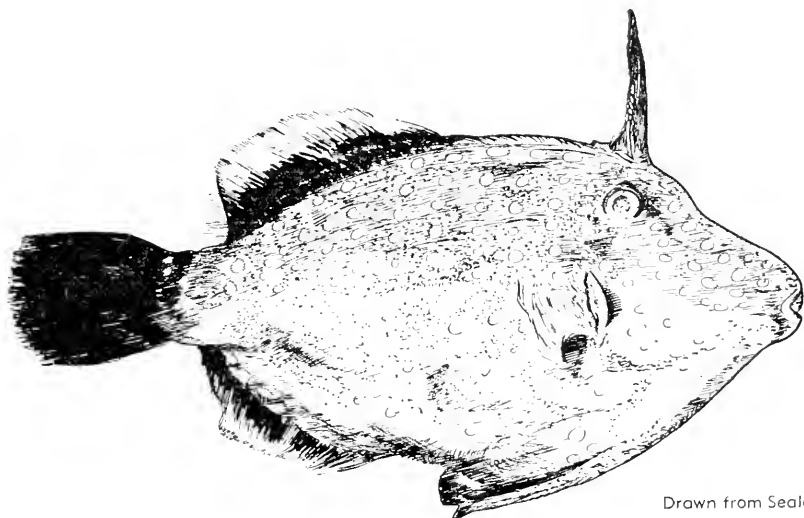


Drawn from Fowler

Cape of Good Hope, through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Howe Island File Fish

129-4 *Cantherines howensis* (Ogilby)



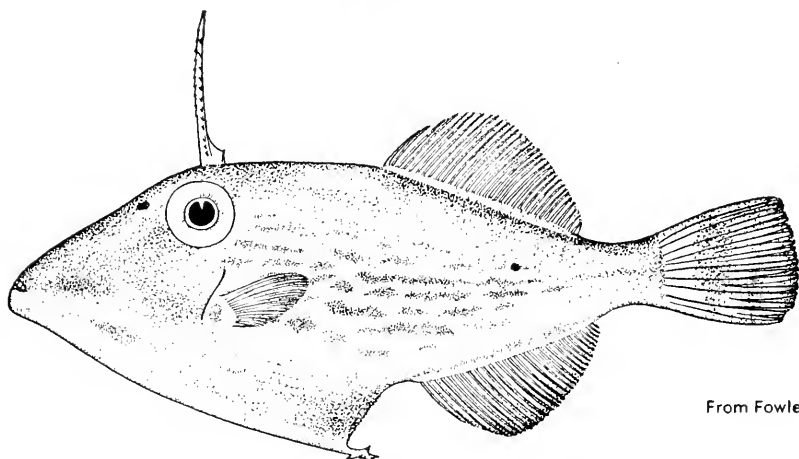
Drawn from Seale

This fish is brownish in color over its body and fins. It is an uncommon species and reaches a length of at least twelve inches. This species is named after Lord Howe Island in the Tasman Sea where it was first discovered.

This file fish is distributed from Lord Howe Island throughout Polynesia as far as the Hawaiian Islands.

Garrett's File Fish

129-5 *Paramonacanthus garretti* Fowler



From Fowler

This rare fish is described as a pale brown color in alcohol. It measured about four inches in length. It was named for Andrew Garrett who collected the first known specimen.

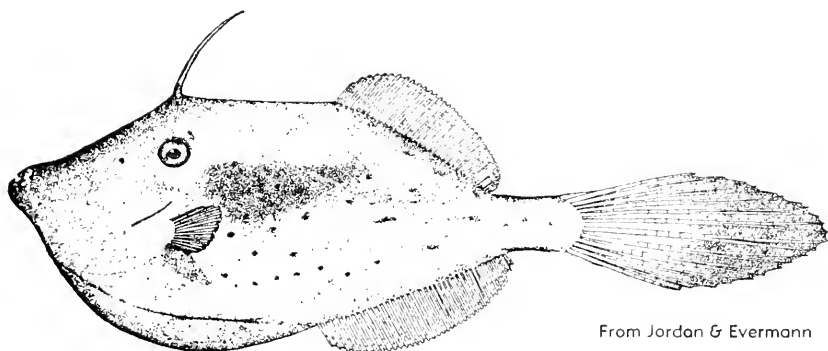
It is a very uncommon species and is known only from the Hawaiian waters.

Oili-lepa or Ohua

129-6 *Alutera scripta* (Osbeck)

This file fish is an olive color in life and is covered over the head and body with spots and lines of sky blue. The dorsal and anal fins are a pale yellow color. The body will measure two feet in length.

Although nowhere common, this fish inhabits all of the tropical seas of the world. It is common in the West Indies and is taken along both coasts of the United States in warmer southern latitudes. It is not a very common fish either in the Hawaiian Islands or in the wide area over which it is distributed.

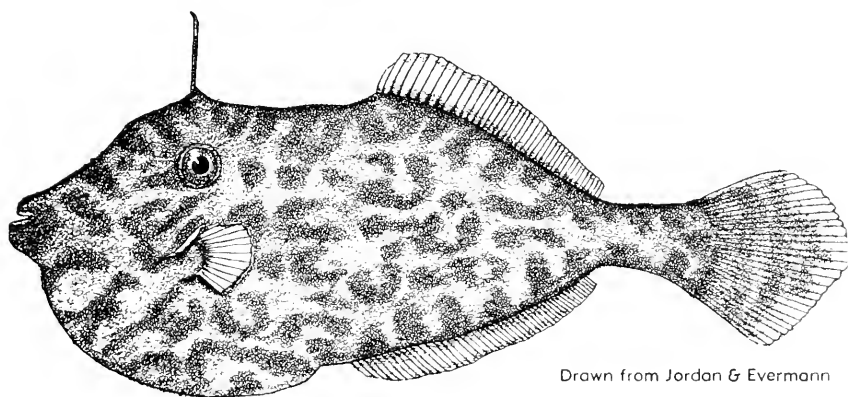


From Jordan & Evermann

This file fish is distributed from Zanzibar and Mauretius, along India, through the East Indies, along Siam and China, through Japan, Micronesia, Melanesia, and Polynesia as far as the Hawaiian Islands. It occurs in both the Eastern Pacific and the Tropical Atlantic Oceans.

Loulu

129-7 *Alutera monoceros* (Linne)



Drawn from Jordan & Evermann

This file fish may be most easily recognized by its spotted body. It reaches a length of about fourteen inches.

An East Indian species, it is distributed from Zanzibar along the coast of India, through the East Indies, along the coast of China, through Japan, Micronesia, and as far north and east as the Hawaiian Islands. It also occurs in the tropical Atlantic Ocean.

THE TRUNK FISH FAMILY

Including the Cucolds or Cowfishes

130 *Family Ostraciidae*

The trunk fishes are a very unusual family of tropical fishes. The bodies of these fishes are enveloped in a bony box composed of a number of six sided plates. These plates are bound together to form a rigid shell in which only the mouth, fins, and tail are movable. The first dorsal fin and the ventral fins are not present and the remaining fins are short and small.

Trunk fishes swim in a peculiar fashion. The dorsal and anal fins furnish the propelling force by a sort of rotary sculling motion. The caudal fin is used as a rudder except in times of emergencies when it functions as in other fishes.

Goode writes that "the chief function of the broad pectorals seems to be that of forming a current of water through the gills, thus aiding respiration which would otherwise be difficult on account of the narrowness and inflexibility of the branchial apertures. When taken from the water, one of these fishes will live for two or three hours all the time solemnly fanning its gill and when restored to its native element seems none the worse for its experience, except that, on account of the air absorbed, it cannot at once sink to the bottom."

These fishes have few enemies because of the shell and horns which protect them. Living in shallow water, being bright in color, and slow in motion, they are easily captured and are common in collection. They are not poisonous when eaten and are often prepared by baking in the shell. They live near the bottom in shallow water in all tropical sea.

Of about twenty known species at least seven are known from Hawaiian waters.

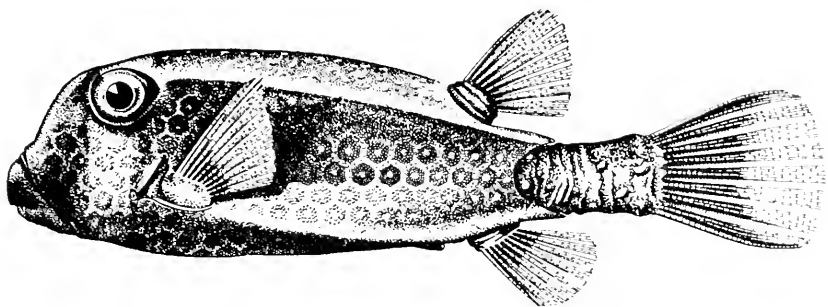
Trunk Fish

130-1 *Ostracion cubicus* Linne

This fish is of a uniform dull color and is marked by small, black spots over its head and belly. The back is convex in shape, while the lower surface is broadly concave. The carapace is spineless and is marked with four blunt ridges. The body reaches a length of about fifteen inches.

This fish is distributed from the Red Sea, Zanzibar, Mozambique, Mauretius, the Seychelles, and Ceylon, through the East Indies, along the coast of Queensland, Japan, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Trunk Fish

130-2 *Ostracion sebae* Bleeker

From Jordan & Evermann

This trunk fish is a deep rich blue or black in color and is covered with golden and white spots. The base of the tail is black. It reaches a length of about six inches.

This species is distributed from Zanzibar through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands and even extends to Clipperton Rock off the Coast of Mexico.

Oopu Pahu

130-3 *Ostracion lentiginosus* Schneider

The body of this trunk fish is gray in color and is covered with small, white spots. It reaches a length of about six inches.

This fish is distributed from Zanzibar, Madagascar, Mauretius, and Ceylon, through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

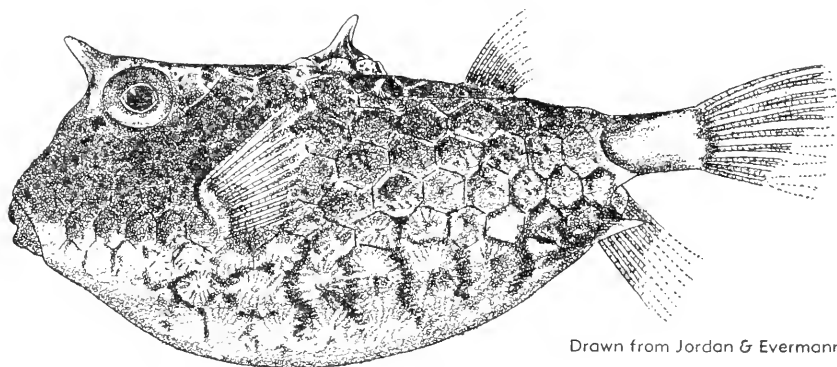
Trunk Fish

130-4 *Ostracion cornutus* Linne

This trunk fish is marked by four ridges over its back. It has a spine above each eye and is marked by spines at the back ends of the ventral ridges. The back is not marked by a median spine. This fish will reach a length of about sixteen inches.

This fish is distributed from the Red Sea, Zanzibar, Mozambique, Natal, Madagascar, Mauretius, Seychelles, and India through the East Indies, along Siam, China, and Queensland and through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Pahu

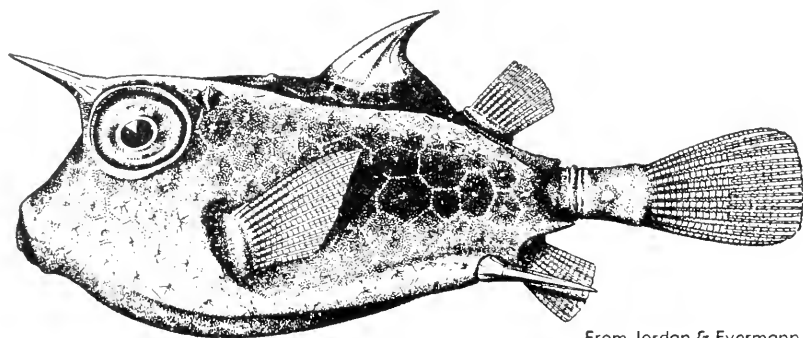
130-5 *Ostracion diaphanus* Schneider

Drawn from Jordan & Evermann

This cowfish is dusky in color over its body and is marked with scattered spots. Several spines ornament the body. A spine which points forward is placed above each eye; another spine is placed near the center of the back; a spine is placed along each side of the back; and three spines are evenly spaced along the ventral ridge. It will reach a length of about sixteen inches.

This cowfish is distributed from the Cape of Good Hope through the East Indies, Japan, Melanesia, and Polynesia as far as the Hawaiian Islands. It also occurs along the coast of California.

Cowfish

130-6 *Ostracion fornasini* Bianconi

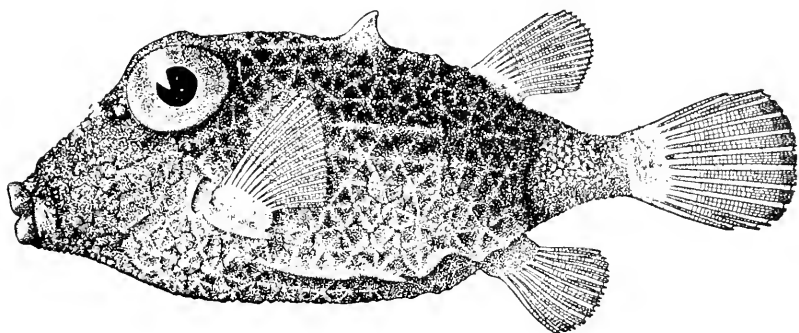
From Jordan & Evermann

This cowfish is covered with irregular markings. It is a smaller species and reaches a length of about three inches.

This cowfish is distributed from Zanzibar, Mozambique, and Mauretius, along China, and through the East Indies as far as the Hawaiian Islands.

Trunk Fish

130-7 *Aracana aculeata* (Houttuyn)



From Gilbert

This rare trunk fish is a grayish olive color above and measures about four inches in length. A rare fish in Hawaiian waters, it was dredged off Laysan Island between 57 and 163 fathoms. It is fairly common in Japanese waters.

This fish is known only from Japan and the Hawaiian Islands.

THE SHARP-NOSED PUFFER FAMILY

131 *Family Canthigasteridae (Tropidichthyidae)*

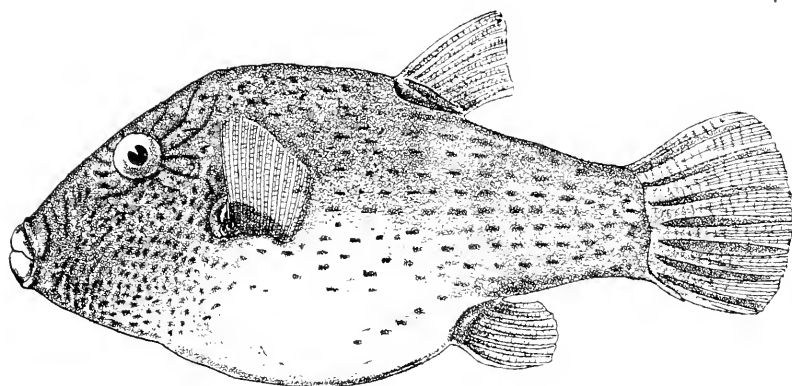
The family of sharp-nosed puffers is a small, brightly colored group of globe fishes. They all have sharply keeled backs and have their nostrils either small or wanting. They are all small in size, seldom exceeding six inches in length, and are found only in tropical seas.

Six members of this family are known from Hawaiian waters.

Sharp-Nosed Puffer

131-1 *Canthigaster amboinensis* (Bleeker)

This little puffer is darker above than beneath and is covered with spots on the upper side of the body. Ten or more blackish lines radiate from the eye and the tail is marked by seven or more blackish horizontal lines. It reaches a length of about four inches.

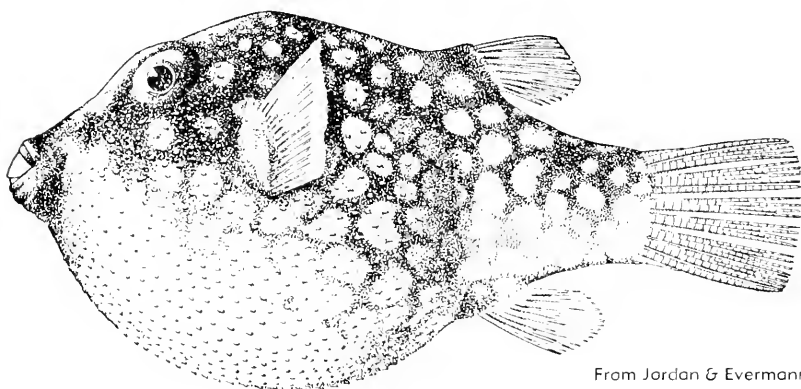


Drawn from Jordan & Evermann

This fish is distributed throughout the East Indies and Polynesia as far as the Hawaiian Islands.

Sharp-Nosed Puffer

131-2 *Canthigaster jactator* (Jenkins)



From Jordan & Evermann

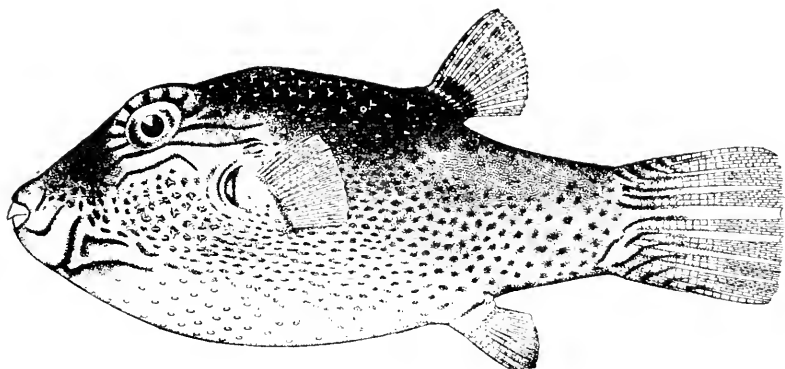
This little puffer is covered over its body with a large number of bright blue spots which are so closely set together that the darker ground color of the animal appears as a darker network. It measures about three and one-half inches in length.

This fish is found in the Hawaiian Islands and its leeward chain.

Sharp-Nosed Puffer

131-3 *Canthigaster rivulatus* (Schlegel)

This little puffer is dark in color above. It is spotted over its entire



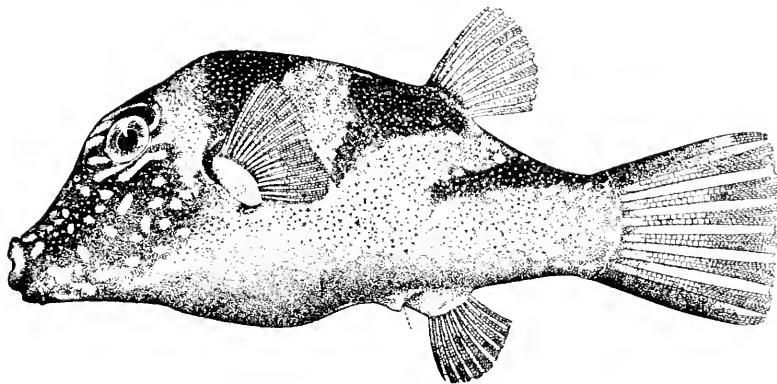
From Jordan & Evermann

body and is marked by a few dark radiating lines about the eye. It reaches a length of about three inches.

This fish is a common species in Japanese waters. It is known from Japan and the Hawaiian Islands.

Puffer

131-4 *Canthigaster cinctus* (Richardson)



From Jordan & Evermann

This puffer is dark above and yellowish orange beneath. The anal fin is bluish in color, the pectorals are white and the dorsal fin is orange in color. It reaches a length of about four inches.

This fish is distributed from Zanzibar through the East Indies, along the coast of Queensland, through Melanesia, and Polynesia as far northward as the Hawaiian Islands.

Puffer

131-5 *Canthigaster margaritatus* (Ruppell)

The color and markings of this species vary greatly. It will reach a length of about four inches.

This puffer is distributed from the Red Sea, Zanzibar, and Mozambique, through the East Indies, along the coast of China, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Puffer

131-6 *Canthigaster striolatus* (Quoy & Gaimard)

This puffer is marked by a dark blotch on each side of the dorsal fin. Several lines run forward and backward from the eye. Each side of the snout is marked with about three curved lines. The body reaches a length of about four inches.

This puffer is distributed through the East Indies, the Philippines, Melanesia, and Polynesia as far as the Hawaiian Islands.

THE PUFFER OR GLOBEFISH FAMILY

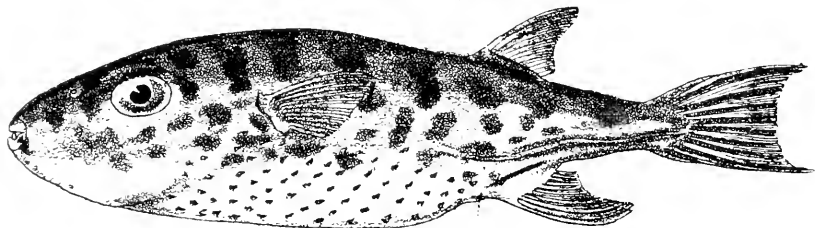
132 *Family Tetrodontidae (Chonerhinidae)*

The members of the puffer fish family are famous for their ability to inflate themselves when annoyed into a large round ball. When taken out of the water, they will often fill their stomachs with air and float belly upward. They are all sluggish in their habits and spend most of their time swimming lazily about or perched in a quiet place. They are not used as food because the flesh is reported to be unappetizing and in some species is thought to be poisonous.

Of this family at least five species are known from the Hawaiian Islands.

Puffer

132-1 *Sphaeroides lagocephalus* (Linne)



Drawn from Jordan & Evermann

This puffer fish shades from black above through steel blue on the sides to a silvery bluish-white beneath spotted with black. It reaches a length of five inches.

This puffer is distributed from South Africa and Mauretius, along India, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands. It is also found in the tropical and subtropical Atlantic Ocean.

Swell Fish

132-2 *Sphaeroides hypselogenion* (Bleeker)

The body of this fish is marked by a lateral band, by widely scattered spines, and by many spots distributed over the head and back. The body reaches a length of about six inches.

This fish is distributed from the Red Sea and Zanzibar through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Blow Fish

132-3 *Liosaccus cutaneus* (Günther)

This puffer is olive gray in color above, pure gray beneath, and is without markings. It reaches a length of at least fourteen inches.

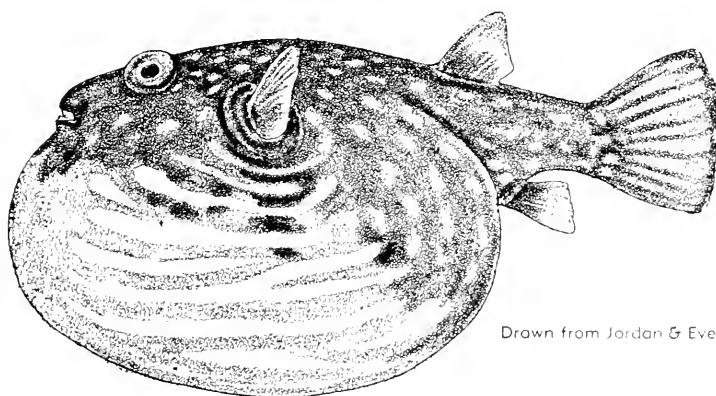
This fish is probably circumtropical in its distribution. It occurs at St. Helena, the Cape of Good Hope, and in other parts of the Atlantic Ocean. It is an uncommon species in Hawaiian waters.

Oopuhue

Also known as the Maki-maki, Keke, or Akeke

132-4 *Tetrodon hispidus* Linne

Plate VIII, Figure 11



Drawn from Jordan & Evermann

This puffer is an olive green color above and is marked with pearly or bluish white spots. This fish varies widely in color; the belly may be either a plain white, marked with yellow, or marked with parallel stripes of light olive color. It will reach a length of about fourteen inches.

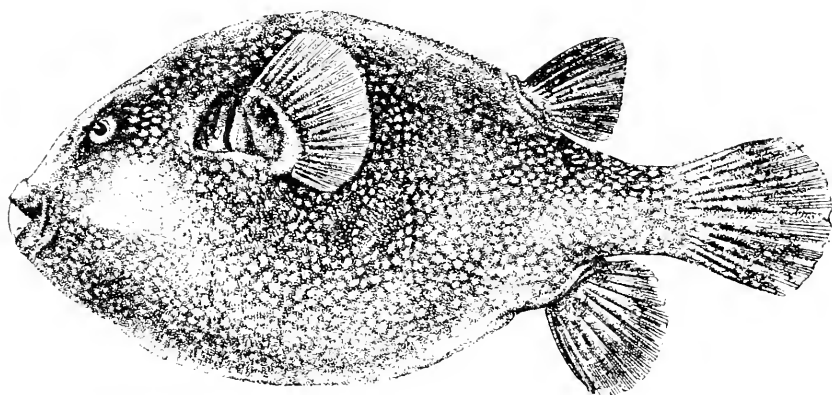
This puffer is probably the most common member of its family. It occurs in fish ponds, in brackish water, and in fresh water ponds. This fish has the habit of puffing up when taken from the water and will lie or float belly up until it is returned to the water or until danger has passed; then it will collapse and swim away.

This fish was regarded as poisonous in old Hawaii and was named "make-make" or "deadly death." It was reported to be the most poisonous of all fishes and its galls used to poison arrows. These statements have not been verified. It is also reported that this fish is relished by the Chinese, and is used by them in making a thin soup.

This fish is distributed from the Red Sea, Zanzibar, Mozambique, Natal, along the coast of India, Ceylon, through the East Indies, Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Puffer

132-5 *Tetrodon meleagris* Schneider



From Jordan & Evermann

This puffer is black in color above, grayish-white beneath, and is covered with small, white spots and prominences. It reaches a length of at least thirteen inches.

This species is distributed throughout Micronesia, Polynesia, and the Hawaiian Archipelago.

THE PORCUPINE FISH FAMILY

133 Family *Diodontidae*

The family of the porcupine fishes is a small group of square or spherical-shaped fishes in which the bodies are covered with two-rooted or three-rooted spines. They are in general sluggish fishes, living in shallow water among sea weeds and coral heads. Like the balloon fishes, they are able to puff up by taking either air or water into their bodies.

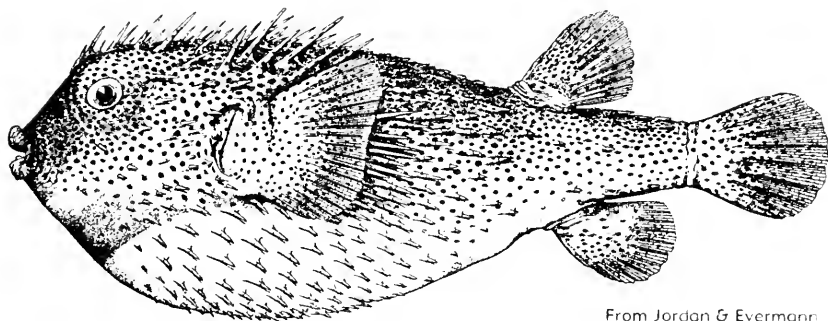
They are rarely used as food and are regarded as poisonous, especially in the tropics.

Of about fifteen known species, only three are known from the Hawaiian Islands.

Common Porcupine Fish

Also known as the Oopu Okala

133-1 *Diodon hystrix* Linne



From Jordan & Evermann

This porcupine fish is dark mottled brown in color above and is spotted with black. Their bodies are covered with spines like the other members of their family. They reach a length of about two feet.

They are sluggish fishes, relying on their spines for their protection. They appear to be most common about beds of sea weeds and are often taken on hook and line.

This porcupine fish is distributed from India, through Melanesia, Micronesia, and Polynesia as far as the Hawaiian Islands.

Lesser Porcupine Fish

133-2 *Diodon holocanthus* Linne

This porcupine fish resembles the common species except that the spines on the front of the head are longer.

This fish in general is found in the tropical eastern Pacific and Atlantic Oceans. It is distributed from the Cape of Good Hope through the Bourbons, along India, through the East Indies, the Philippines, along the coasts of China and Queensland, through Micronesia and Polynesia as far as the Hawaiian Islands.

Oopuhue or Burr Fish

Also known as the Pacific Rabbit Fish, Swell Toad Fish,
Torabuku, or Tiger Puffer

133-3 *Chilomycterus affinis* Gunther

This burr fish is blue in color above and white beneath and is marked with small dark spots on the forehead and at the bases of the fins. It grows to a large size and will reach a length of over two feet.

This fish is widely distributed through the Pacific Ocean and is found from Japan to the coast of Mexico and California. It is found throughout the Hawaiian Archipelago and its Leeward Islands.

THE HEAD FISH OR SUNFISH FAMILY

134 *Family Molidæ (Orthogoriscidae)*

The sunfishes are a group of degenerate fishes in which the body is deep and oval in shape and is covered by a thick, tough, leathery skin. They possess huge heads to which the fins appear to be attached, while the posterior portions of the body are shortened to the point where they appear to be missing. They are in general uniformly colored, either gray, olive-brown or black with silvery reflections on the sides. They reach an enormous size; specimens will measure eight or ten feet in length and will weigh as much as 2,000 pounds.

The members of the family are pelagic in their habits and live in the open sea. They swim with a kind of skulling motion and spend a large part of their time at the surface basking in the sun. The young members of the family are variously shortened in form and are armed with spines. The flesh of these giant fishes is coarse and tough and is not often used as food.

Three members of this family are known from Hawaiian waters.

Ocean Sunfish

Also known as the Common Headfish, Common Sunfish, Short Sunfish, Round-Tailed Sunfish, Kahala, or Makua

134-1 *Mola mola* (Linne)

Plate I, Figure 10

The body of this sunfish is oval in shape, narrow in width, and is set off by long dorsal and anal fins. The body is covered by a tough, thick, leathery skin which is dark gray above, grayish brown on the sides, and covered with a silvery reflection. It is marked with a broad blackish bar along the base of the dorsal, caudal, and anal fins. The posterior margin of the body is rounded or wavy in outline. They will reach a length of eight feet and a weight of one ton.

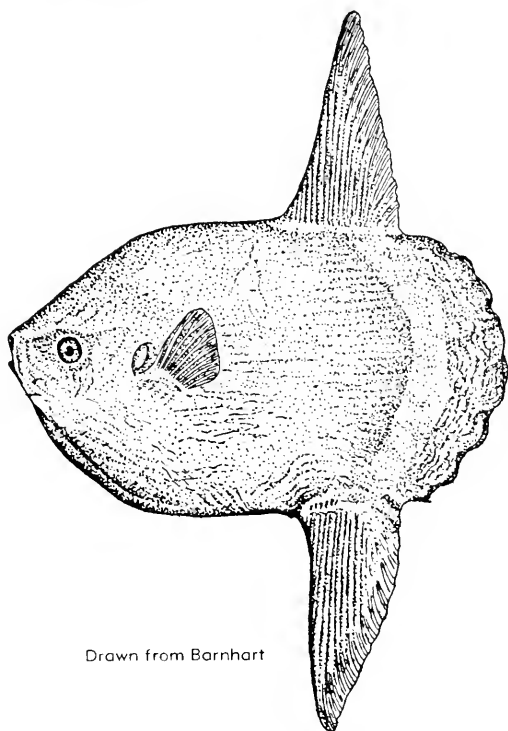
The sunfishes live in all tropical sea, although they are not at all common. They swim lazily at the

surface with the high fins often out of the water or lie on their sides sunning themselves with the fins waving in the air. They feed on jellyfishes, small fishes, crustaceans, and other marine creatures.

Sunfishes are usually found living alone, although they sometimes occur in pairs and are thought to be gregarious at the breeding seasons. They will lay 300,000,000 eggs which hatch into creatures very different from the adults.

The flesh is tough, although it is not poisonous, and is seldom eaten. The Japanese consider the liver a delicacy.

The Swedish botanist Linne gave the name of *Mola* to these fishes because they resembled a mill wheel in shape.

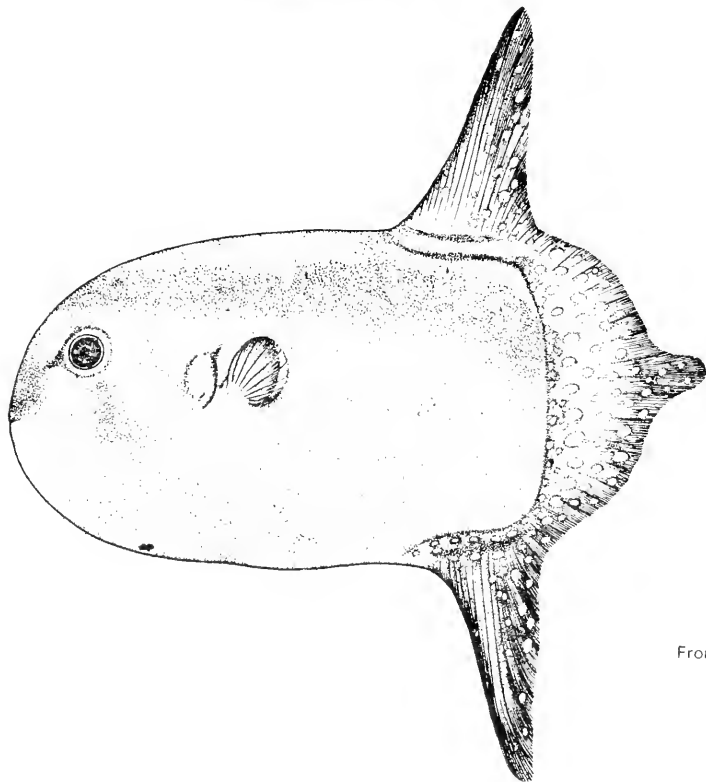


Drawn from Barnhart

The ocean sunfish is found in surface waters of the tropics throughout the world.

Tailed Sunfish or Pointed Tailed Sunfish

134-2 *Masturus lanceolatus* (Lienard)



From Fowler

This sunfish has the posterior end of the body drawn out so that it ends in a pointed gray caudal fin. It is a rare fish and very little is known about it.

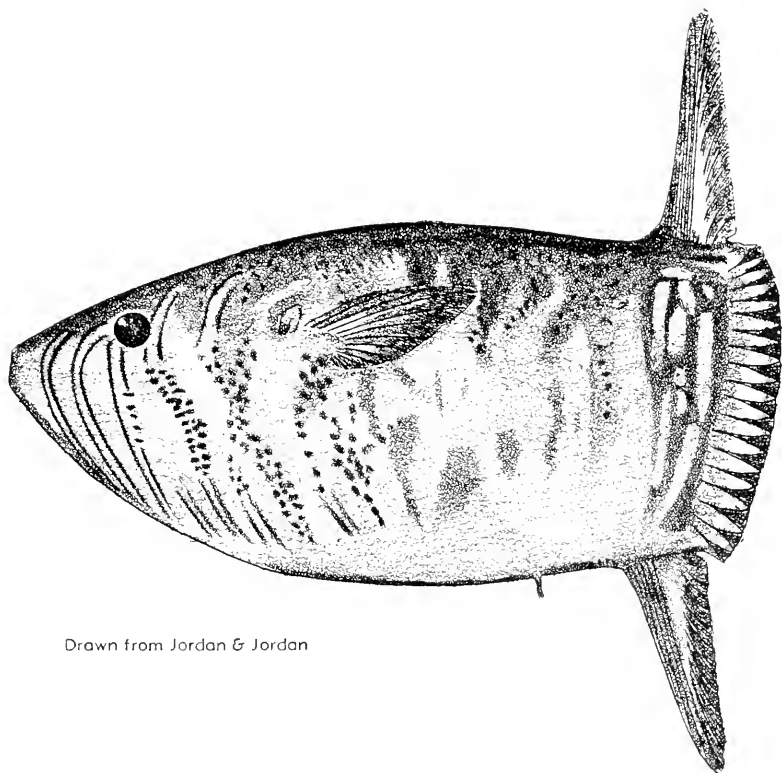
It is known from the Island of Mauretius and the Hawaiian Islands.

Makua

Also known as the King of the Mackerels, Oblong Sunfish,
or Truncated Sunfish

134-3 *Ranzania truncata* (Gmelin)

This fish is a beautiful bright dark brown or blackish silvery color in



Drawn from Jordan & Jordan

life. The natural colors change immediately after death. It reaches a length of two feet.

Jordan reports that "In Hawaii it is believed that all the Scombroid fishes (tuna and mackerel) are subject to the rule of the makua and that they will disappear if this fish be killed." W. A. Bryan relates that these fishes are under the rule of the spirits or Akua.

This sunfish is comopolitan in its distribution. It occurs throughout all of the tropical seas of the world. It occurs about the Hawaiian Islands although it is not common there.

THE ANGLER FISH OR FISHING FROG FAMILY

135 *Family Lophiidae*

The angler fishes have large heads and small bodies. The head makes up the largest part of the body and is flattened in shape and contains an enormous mouth equipped with sharp teeth and strong muscles. The skin is smooth in texture but contains dermal flaps about the head.

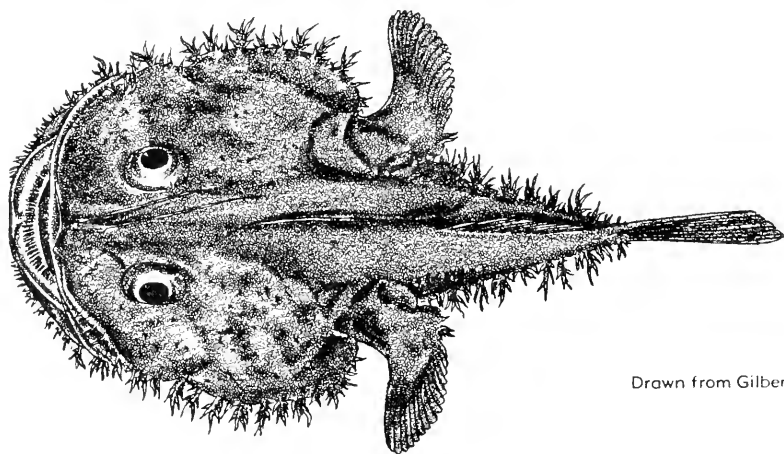
The members of this group are famous for the lure on their heads which they use in leading fishes into their mouth. This lure is really the first spine of the dorsal fin which has been elongated and bent forward so that it hangs over the mouth. Fish which come too close to the lure are engulfed in the large mouth to form a part of the food of this voracious fish.

The anglers all live on the bottom at great or moderate depths.

Of four or five species known, only one is recorded from the Hawaiian Islands.

Angler Fish

135-1 *Lophiomus miacanthus* Gilbert



Drawn from Gilbert

The body of this angler fish is dull in color and is covered with many white flaps. It measures about six inches in length. A rare fish, it was dredged from deep water between 228 and 312 fathoms.

It is known only from the Hawaiian Islands.

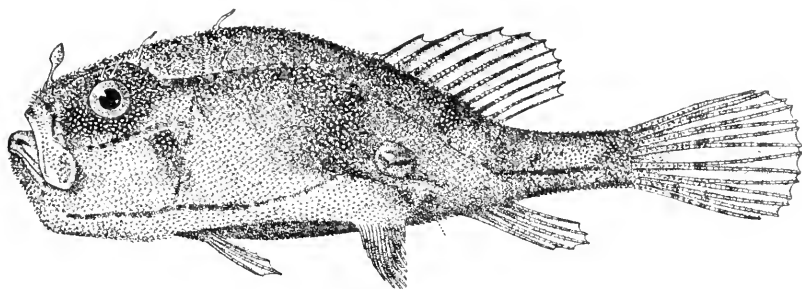
THE SEA-DEVIL FISH FAMILY

136 Family *Ceratiidae*

The family of the sea-devils are degenerate fishes related to the anglers. They have compressed bodies and a vertical mouth and are all black in color. They have light thin bones, and flimsy, unstable skin, muscles, and organs. Usually found in the arctic seas, they are always taken in dredges at considerable depths.

Of fifteen or twenty known species, only two are recorded from the Hawaiian Islands.

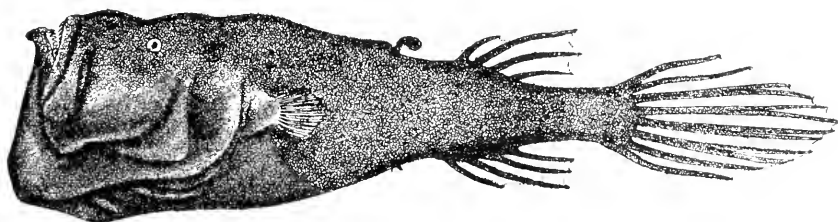
Sea-Devil Fish

136-1 *Chaunax umbrinus* Gilbert

From Gilbert

This rare fish is known from a single specimen taken from Pailolo Channel between Molokai and Maui. It was uniformly dark in color and measured about two inches in length. It is known only from the Hawaiian Islands.

Sea-Devil Fish

136-2 *Miopsaras myops* Gilbert

Drawn from Gilbert

This sea-devil fish was uniformly black in color and was covered with closely set prickles. It measured about four inches in length. It was taken near Kauai between 409 and 550 fathoms and is known only from the Hawaiian Islands.

THE FROG FISH FAMILY

137 Family *Antennariidae*

The frog fishes are unusual in form and color and usually imitate the things around them. Their bodies are flattened, the mouth vertical, and the skin is prickly or covered with dermal flaps. In general, the members of this family are surface fishes and are never found at great depths. They

live about sand banks and coral rocks in tropical seas or are found in floating seaweeds.

Because they have the curious habit of holding air in the mouth, they are able to float and are carried long distances in the sea. A tropical group of fishes, they are very widely distributed.

At least nine members of this family are known from Hawaiian waters.

Frog Fish

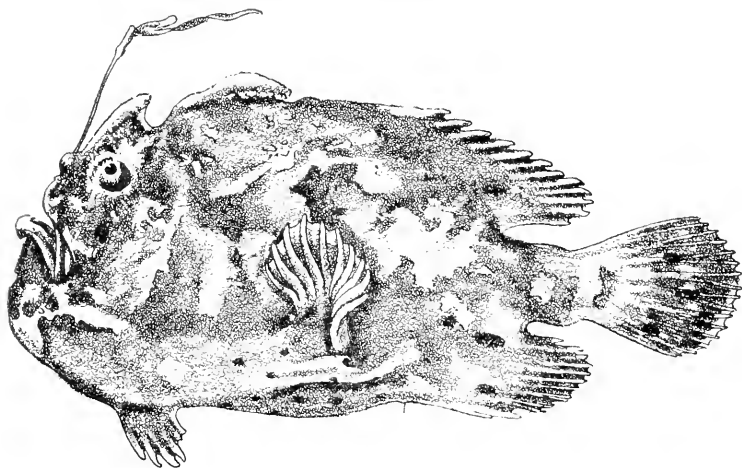
137-1 *Histrio histrio* (Linne)

This frog fish is a light olive-brown color above and is marked with unusual markings. It reaches a length of at least five inches. This fish is a pelagic species and lives in the open sea, where it drifts about in masses of sea weed.

This species is circumtropical in its distribution and is found in all of the tropical seas of the world. It is occasionally taken in Hawaiian waters.

Frog Fish

137-2 *Antennarius bispidus* (Schneider)



Drawn from Jordan & Evermann

The skin of this frog fish is rough and prickly. It reaches a length of at least seven inches.

This fish is distributed from India through the East Indies, Melanesia, and Polynesia as far north as the Hawaiian Islands.

Frog Fish

137-3 *Antennarius commersonii* (Shaw)

The body of this frog fish in life is probably of a dark chocolate color. It measures about five inches in length. It has a bait suspended from its head as a lure to passing fishes.

This fish is distributed from Zanzibar and Mauretius, through the East Indies, along the coast of Queensland, through Micronesia and Polynesia as far as the Hawaiian Islands.

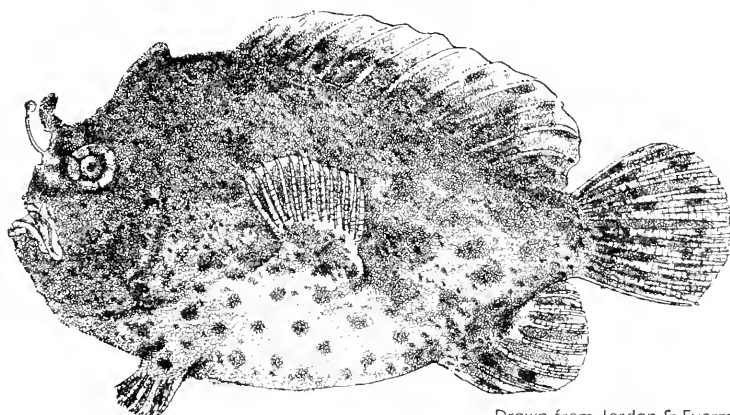
Hawaiian Frog Fish

137-4 *Antennarius sandvicensis* (Bennett)

This frog fish resembles the previous species but is said to have a somewhat smaller eye. It measures about three inches in length. It is known only from the Hawaiian Islands.

Frog Fish

137-5 *Antennarius nummifer* Cuvier



Drawn from Jordan & Evermann

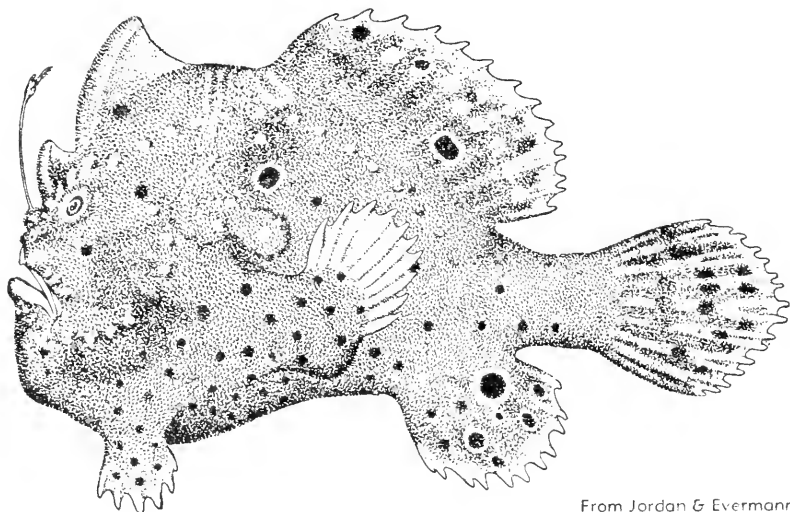
The body of this frog fish is darker above, lighter beneath, and is covered with large, round spots. It measures at least two inches in length.

This fish is distributed from the Red Sea through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Frog Fish

137-6 *Antennarius leprosus* (Eydoux & Souleyet)

The body of this frog fish is rough in texture and is covered with black spots. It reaches a length of about six inches.



From Jordan & Evermann

This fish is known from the Hawaiian Islands and from Woodlark Island located in the Coral Sea off the southeastern end of New Guinea.

Frog Fish

137-7 *Antennarius bigibbus* Lacepede

This frog fish is mottled in color, mostly brownish, grayish, and whitish. It has the usual large mouth and heavy lower jaw. The bait upon the front of the head reaches almost to the base of the third dorsal spine. This fish reaches a length of at least one and one-half inches.

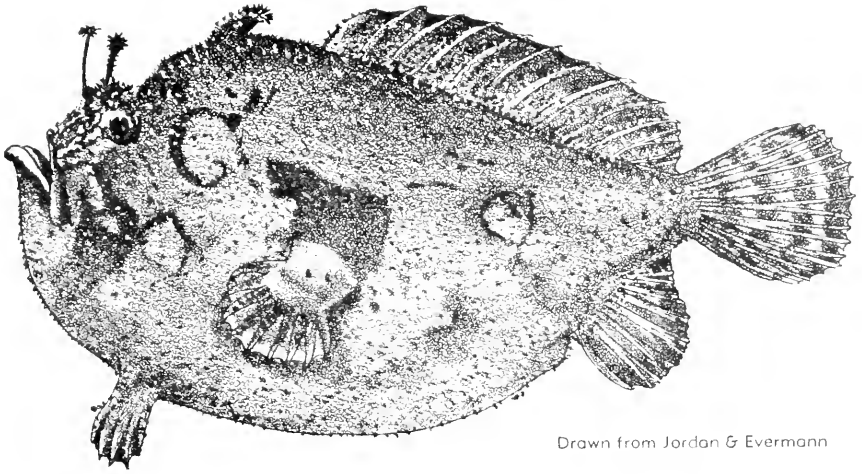
This species is found from Mauritius and Madagascar, through the East Indies, Micronesia, and Polynesia as far as the Hawaiian Islands.

Frog Fish

137-8 *Antennarius duescus* Snyder

The body of this fish is a pale purplish lilac in color resembling the plants among which it lives. It is mottled and spotted with blackish. It reaches a length of about two inches.

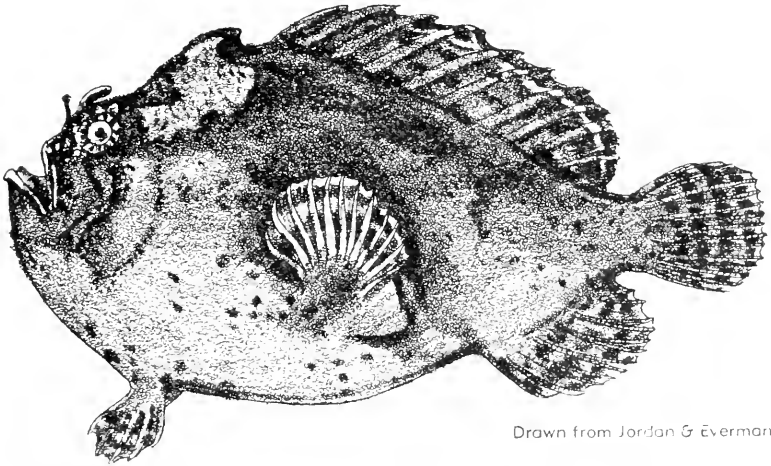
This fish was taken in water between 32 and 75 fathoms and is known only from the Hawaiian Islands.



Drawn from Jordan & Evermann

Frog Fish

137-9 *Antennarius nexilis* Snyder



Drawn from Jordan & Evermann

The body of this frog fish is rough and prickly in texture. In color it is brownish and is marbled and marked with deeper spots. It reaches a length of about two inches.

This fish is found in the Hawaiian Islands and throughout southern Polynesia.

THE BAT FISH FAMILY

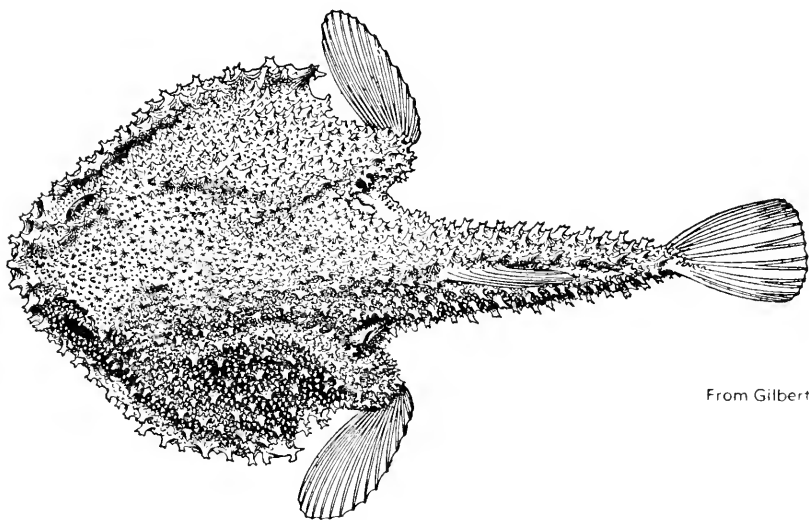
138 Family *Oncocephalidae* (*Ogcocephalidae*, *Malthidae*)

The family of the bat fishes are related to the angler fishes, but they have smaller mouths and depressed bodies which are covered with hard, bony warts. All of the members of the family live in the tropical seas. They walk along the bottom like toads and are distributed over the ocean bottom from very shallow water to immense depths. The deep sea forms are small and more or less degenerate.

Five members of this family are known from the Hawaiian Islands.

Red Bat Fish

138-1 *Dibranchus erythrinus* Gilbert



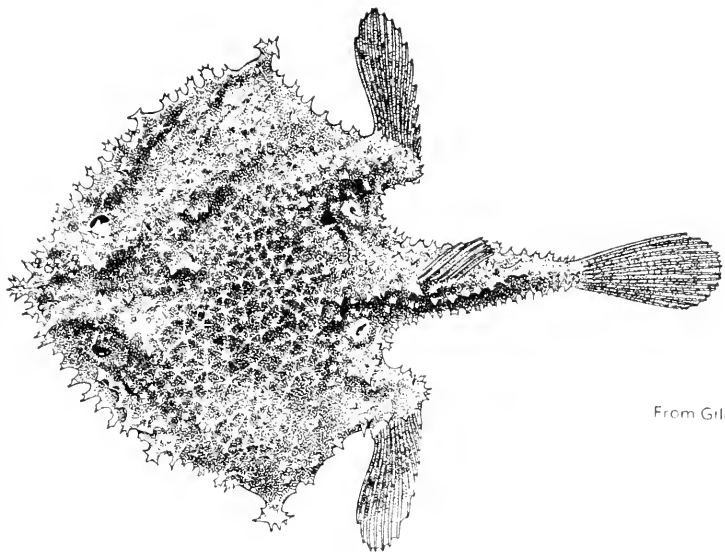
From Gilbert

This bat fish is known from a single specimen which was a uniform light carmine red color and measured about seven inches in length. It was taken off the Island of Kauai between 403 and 477 fathoms.

Bat Fish

138-2 *Dibranchus stellulatus* Gilbert

This bat fish is known from a single specimen which measured about two inches in length. It was thought to possibly be the young of the previous species. It was taken off the Island of Maui between 178 and 202 fathoms.



From Gilbert

Bat Fish

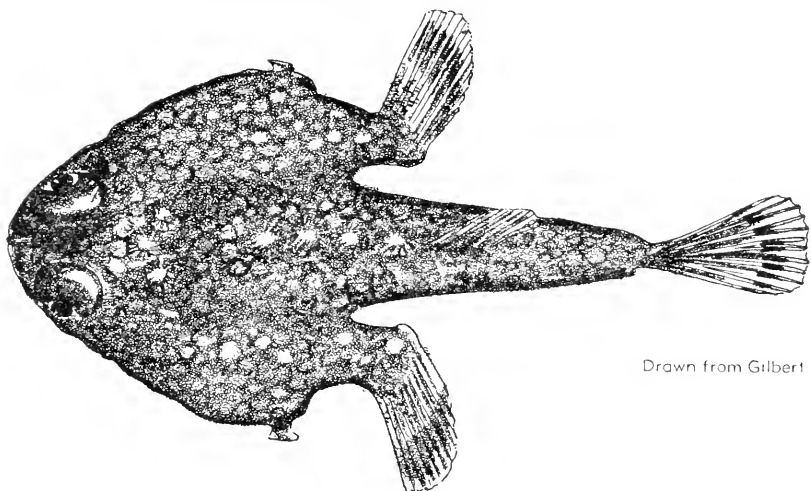
138-3 *Malthopsis mitrifer* Gilbert & Cramer



From Jordan & Evermann

This bat fish is a deep water species measuring about three inches in length. It is known only from the Hawaiian Islands and was taken between 192 and 352 fathoms beneath the surface.

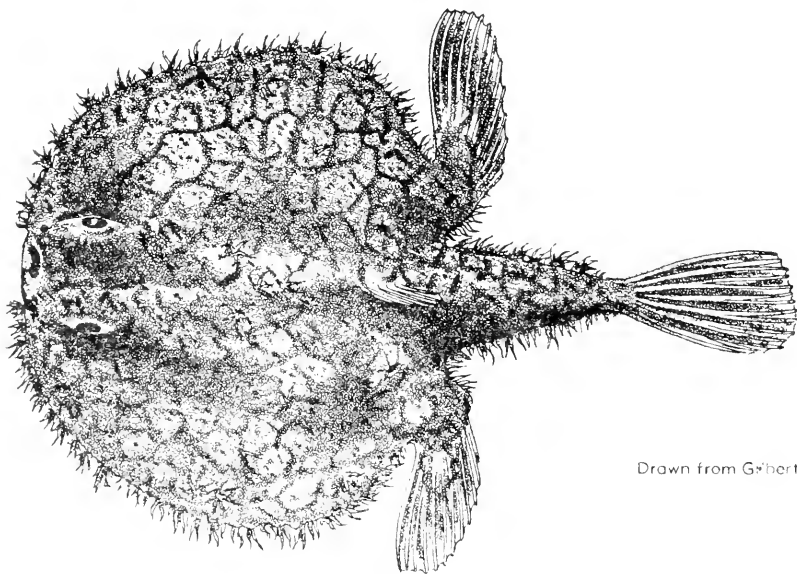
Jordan's Bat Fish
138-4 *Malthopsis jordani* Gilbert



Drawn from Gilbert

This bat fish is a deep water species known only from the Hawaiian Islands. It measured about three inches in length and was taken in a dredge between 115 and 178 fathoms. It was named for David Starr Jordan.

Bat Fish
138-5 *Halieutaea retifera* Gilbert



Drawn from Gilbert

This bat fish is light olive in color above, reddish beneath and reaches a length of about four inches. It is a deep water species and was taken in a dredge between 57 and 211 fathoms. It is known only from the Hawaiian Islands.

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